

THE ILLUMINATING ENGINEER

LIGHT
LAMPS
FITTINGS
AND
ILLUMINATION

THE JOURNAL OF GOOD LIGHTING

Official Organ of the Illuminating Engineering Society

FOUNDED IN LONDON 1908

Edited by
LEON GASTER

OIL
GAS
ELECTRICITY
ACETYLENE
PETROL-AIR
GAS
ETC.

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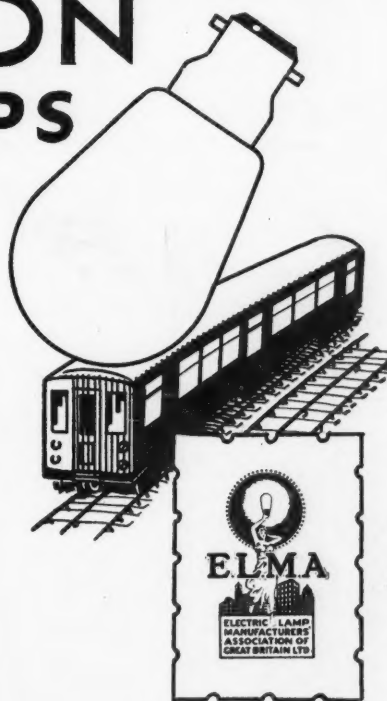
The Fourth Annual Conference of the Institution of Public Lighting Engineers—Exhibition of Street Lamps and Lighting Appliances—Conference of the International Illumination Commission (Bellagio, Italy)—Progress in Industrial Lighting—Street Lighting with Gas—News from Abroad, etc.

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THE GAS LIGHT & COKE COMPANY
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Developments of Public Lighting

IN this issue we present an account of the proceedings at the fourth Annual Conference and Exhibition of the Institution of Public Lighting Engineers, which took place in Brighton during September 12th to 15th. The conference, as usual, presented a good opportunity of reviewing progress in public lighting. The practice of holding conferences in various cities in turn is a good one. Local interest in public lighting is stimulated, and as papers reviewing the local lighting conditions are usually presented, a useful fund of information should be assembled in course of time. Representatives of the Illuminating Engineering Society and other bodies interested attended, and their participation in the discussions was distinctly helpful.

The Presidential Address by Mr. Alex. C. Cramb emphasized the fact that insufficient progress has been made in street lighting since 1914, considering the great increase in the speed and volume of traffic. His suggestion that attention should be devoted mainly to the improvement of the poor lighting in many subsidiary streets, and to the avoidance of sharp contrasts in brightness, will be generally approved. As Mr. Cramb remarked, the lighting of some of our main thoroughfares will bear comparison with that in any cities in the world. But there are many streets, formerly of small importance but now carrying heavy traffic, where improvements in illumination are much more urgent.

Mr. Cramb suggested that the time is ripe for public lighting to be placed under some appropriately constituted central authority. Local authorities should provide the lighting conditions necessary for public safety, but this should be supplemented by special lighting to meet the requirements of modern high-speed traffic, the extra expenditure being met by utilizing a portion of the funds obtained through the taxation of motorists. It is now many years since the writer urged that street lighting was no longer a parochial matter, but a national problem. The best plan would probably be to establish, in the first instance, a central advisory committee, on which the Ministry of Transport, the National "Safety First" Association, the Institution of Public Lighting Engineers, the Illuminating Engineering Society, and other bodies interested should be represented. A portion of the Road Fund might well be applied in the first instance to experiments.

This step would be opportune in view of the fact that the B.E.S.A. Standard Specification for Street Lighting has now been issued in final form. This specification was introduced to members in the

paper read by Messrs. L. B. W. Jolley, J. M. Waldram and R. Watson. To some of those present the formulæ and mathematics may have appeared somewhat formidable. But, except for the treatment of glare, the specification is commendably simple. What is chiefly needed is that the practical working of the specification should be examined and its principles illustrated by demonstrations. The suggested advisory committee could aid considerably by arranging model installations in selected lengths of streets, showing how the requirements for the various classes of streets could be complied with, and what the approximate cost would be. Such experiments could readily be made in leading provincial cities, where the improvement of conditions of public lighting is already receiving consideration.

The need for central control is also illustrated by the fact that public lighting now embraces quite a number of special functions besides the lighting of the streets. The special lighting of crossings and refuges, the use of illuminated danger signs and directional notices, and the application of coloured luminous signals for traffic control have to be considered. Public lighting is also intimately associated with the motor-headlight problem. All these problems should be dealt with together. Developments in this direction were illustrated in an able paper read by Mr. R. L. Matthews (Chief Constable of Leeds), and by the exhibition of lighting appliances.

On pp. 287-294 we present a special account of this exhibition, in which 24 firms participated. The efforts of these firms added considerably to the interest of the gathering, and we were very glad that on this occasion ample opportunities were afforded of examining these exhibits. Acknowledgment should also be made of hospitality of the Brighton Corporation and of the local gas and electrical undertakings, and of the services of Capt. W. J. Liberty, the Secretary of the Institution, who devoted much time and effort to the organization of the conference.

At future conferences further useful information will doubtless be presented. We should like to suggest, however, that the time is now ripe for detailed work on special street-lighting problems by committees, particularly with regard to matters on which standardization is practicable. The work of such committees would be summarized at the annual conferences, when definite practical recommendations might be presented for adoption.

The International Illumination Commission

THE meeting of representatives of the various technical committees of the International Illumination Commission, held at Bellagio (Italy) during August 31st to September 3rd, proved to be of considerable interest. We shall be dealing with the proceedings more fully in our next issue. But meantime we may record some impressions of this gathering, at which 67 delegates from ten countries were present. All the countries affiliated to the Commission (Austria, Belgium, France, Germany, Great Britain, Holland, Italy, Japan, Switzerland, and the United States of America) were represented. It is particularly gratifying to record the presence on this occasion of representatives of the ex-enemy nations, thus showing the removal of all bars to full international action.

It should be explained that this gathering was a preliminary to the next plenary session of the Commission, which is to be held in the United States next year. Whilst the meeting was designed largely for conferences of the various technical committees, two general conference sessions were held and a number of interesting papers were submitted. Progress in the chief subjects that are now being studied by committees (including automobile headlights, factory and school lighting, nomenclature definitions and symbols, heterochromatic photometry, etc.) was reviewed. Industrial lighting received special attention, such problems as the elimination of glare and the design of standard reflectors for industrial use being considered in detail. In the course of the proceedings a paper was presented by the writer reviewing developments in Great Britain. This furnished an opportunity of explaining the methods of the Illumination Research Committee of the Department of Scientific and Industrial Research, and considerable interest was expressed by foreign delegates in the work being carried on by this committee. General approval was expressed of the sound and scientific principles on which future recommendations on factory lighting in this country are to be based.

The other chief topic of discussion was the question of regulations for motor headlights. As is well known, there are considerable variations in the methods of different countries. There was a general recognition that the "dimming" of headlights when meeting an oncoming car is not desirable, and that the use of some form of "double-beam" device (e.g., that based on the use of dual filaments) was to be preferred.

The general question of the scope and functions of the Commission has also been receiving attention. One was glad to find amongst delegates present a general feeling that future work should be conceived on broad lines, dealing with illumination and the application of light as a whole, rather than the utilization of some particular illuminant. An official account of the conference (to which will be appended an historical review of the activities of the Commission since its inauguration, following the resolution moved by the writer at the Turin Electro-technical Congress of 1911), is to be issued in due course. Meantime we have received from Dr. N. Halbertsma a very useful account of his impressions at Bellagio, which will appear in our next number.

The work of the Commission deserves to be more widely known. Conferences are only held at intervals of several years, and it would be an advantage if exchange of opinions on the topics discussed could proceed more continuously. Most of those who participate in the work of the Commission are already corresponding members of the Illuminating

Engineering Society. It was very pleasant to meet many experts on illumination abroad, whose names are familiar to our readers, and who follow developments in illuminating engineering in this country with close attention. We take the opportunity to repeat the invitation conveyed at Bellagio to all foreign delegates to become corresponding members of the I.E.S. and to utilize the columns of its official organ for reports on developments in their respective countries. Such data would be of considerable value in paving the way for international understanding, and it is recognized that this journal is in an especially favourable position to be of service as a clearing house for information from abroad.

Progress in Factory Lighting

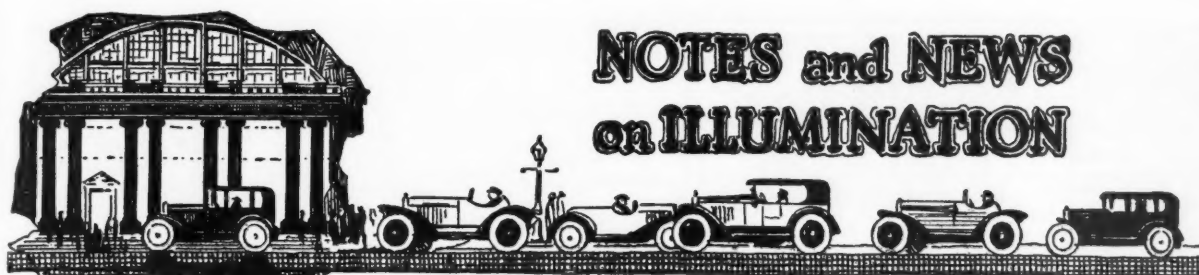
EVIDENCE of the steady progress in industrial lighting is to be found in the Report of H.M. Inspector of Factories for 1926. Reports made by inspectors in the various districts are quoted, and indicate that lighting conditions are much better than they were a few years ago, and that employers are sympathetically inclined to suggestions for improvements. This is no doubt partly due to the enterprise of the chief firms in the lighting industry, but the foundation of this better appreciation of the benefits of good lighting was undoubtedly laid by the work of the Home Office Departmental Committee on Lighting in Factories and Workshops and the conferences initiated by the Home Office with the Joint Industrial Councils of the chief industries. The efforts of the factory inspectors, who are to-day keen advocates of good illumination, have also had a marked educational influence.

Some striking installations are described. Several inspectors comment on the growing tendency to adopt a combination of general and local lighting—moderate diffused illumination being supplemented by well-shaded local lights supplying the "super-illumination" required for certain very fine processes.

One point of special interest is the experience of the influence of faulty vision amongst workers in the Valleyfield Works in Scotland. It was found that much defective paper was being issued from the finishing department. Examinations showed that 25 per cent. of the workers had defective vision and required glasses. Since these have been supplied there have been no further complaints of bad work.

This experience is in line with others—notably that reported in the recent treatise of the Industrial Fatigue Board on the "linking-up" process in the hosiery industry—in showing the vital importance of tests of vision. Complaints of inadequate illumination will not infrequently be found to be based on imperfect vision. Whilst such troubles are accentuated by bad lighting, it should be understood that a person unable to focus the eyes on fine material may be unable to see clearly, however high the illumination. In such cases the provision of suitable glasses, or, in cases of very fine work, magnifying glasses, may be an absolute necessity. Only after this has been done can it be judged whether the illumination is adequate for the purpose in view.

In conclusion, we may add that all those who have the cause of "better lighting" at heart should gratefully recognize the consistently sympathetic attitude of the present and late Chief Inspectors of Factories towards industrial lighting. Their influence has done much to pave the way for advances during recent years.



An Original Escalator-Lighting Installation

Readers may be interested in a highly original method of lighting recently installed on one of the escalators at Waterloo Station. The problem in lighting escalators has always been to furnish sufficient evenly distributed illumination on the stairway, and at the same time to avoid glare in the eyes of passengers. Lighting from above presents some difficulties. It is not always easy to contrive a method which screens the light *both* from the eyes of ascending and descending passengers; in such cases it is usual to aim chiefly at satisfying the needs of those descending, as it is considered that, on the whole, passengers who are descending are most liable to slip. At Waterloo a new departure has been made. Lighting is no longer effected from the roof. Instead of this the illumination is entirely indirect, and is furnished by pedestal units mounted between the two stairways, and directing the light on the white ceiling above. The effect strikes one as restful and satisfactory. It is just possible for passengers to see the illuminated tops of the pedestal units; but the surface exposed does not appear sufficiently bright to be appreciably glaring, and the fact of some of the luminous surface being visible is possibly an advantage in relieving monotony of effect.

Developments in Television

A short time ago we referred to the experiments on television made in the United States by Dr. E. F. W. Alexanderson, research engineer to the General Electric Co. Ltd., whilst, as is well known, Mr. Baird in this country is actively working on the same subject.

But according to a contribution to *Electrical Industries*, by Mr. J. W. Brittain, there are quite a number of other experimenters using somewhat different methods. Mr. Baird's apparatus involves the use of discs and lenses, while Dr. Alexanderson uses a large revolving drum with 24 mirrors round the circumference. The picture is traced out by the zig-zag motions of seven spotlights thrown on a screen. Von Mehaly, in Germany, apparently utilizes a delicate mirror mounted on the twin wires of a species of oscillograph. M. Edouard Belin, in Paris, also uses mirrors, but larger in size and operated by cranks and connecting rods worked by an electric motor. The receiver to his apparatus is a cathode ray oscillograph. In America Mr. C. F. Jenkins, in Washington, is experimenting with glass discs specially ground so as to exercise a prismatic effect. In one receiver operated by Dr. H. E. Ives and his assistants in the Bell Telephone Laboratories in New York, there is a large grid of neon tubes connected to some 2,500 wires. Thus many alternative optical methods of solving the complex problem of tracing out the picture are being studied. It would seem at first sight as though the apparatus must necessarily be too complex for the ordinary observer, and for some time to come the process will necessarily be limited and the results crude. Nevertheless, at least two of these experimenters, Mr. Baird and von Mehaly, anticipate being able to introduce sets for public use in the near future at a cost stated at from £20 to £40 a set.

Although television is certainly in its infancy, and is not generally regarded as a commercial proposition, it is still believed that sets will be readily sold, even at the prices mentioned—so strong is the public demand for a genuine novelty.

Photometric Measurements during Total Eclipses

Mr. Preston S. Millar, who was in charge of the expeditions organized by the Illuminating Engineering Society (U.S.A.) to take observations during the eclipse of January 24th, 1925, draws our attention to an oversight in the article contributed to our August issue,* summarizing some measurements made during the recent total eclipse in this country. In that article it was remarked that possibly these photometric observations were the first carried out during a total eclipse. The present year was, no doubt, the first occasion on which such photometric measurements were made in *this country*—total eclipses in England being rare events. But records have been obtained during total eclipses visible in other countries, and the very comprehensive series of data obtained in the United States in 1925, and embodied in the report sent us by Mr. Millar, deserve special recognition. Experiments were conducted independently by parties in a number of different localities.

Readings in different localities naturally varied considerably, but it would appear that a value of 0.013 foot-candles might be deduced as the absolute minimum due to the corona alone at the centre of the belt of totality. This appears to be in accord with minimum values so far reported in this country. On either side of the absolute minimum values of illumination increased rapidly, and it is suggested that 0.25 foot-candles might be taken as representative of the (average) horizontal illumination prevailing during totality.

An interesting feature was the use of photo-electric cells to supplement ordinary photometric readings. This is a variety of work for which the photometric cell seems specially well adapted.

In an appendix, Dr. C. H. Sharp summarizes observations by earlier observers. It is interesting to observe that records were obtained in the West Indies by Abney and Thorpe as early as 1886. The value of 0.0123 foot-candles deduced from these observations for the illumination of the corona alone, is remarkably close to that inferred from the observations of the Illuminating Engineering Society (U.S.A.) in 1925.

Royal Photographic Society of Great Britain

SEVENTH INTERNATIONAL CONGRESS.

We are informed that the seventh International Congress of Photography will be held in London during 1928, probably towards the end of June or early in July, under the auspices of the Royal Photographic Society. In view of recent developments in photography by artificial light this subject will doubtless receive attention at the Congress, which should be of considerable interest.

A Bibliography of Industrial Hygiene

The attention of readers, especially those concerned with industrial hygiene, may be drawn to a very useful bibliography issued by the International Labour Office of the League of Nations in Geneva. Vol. II, issued in June, brings the number of references up to over 3,000. Subjects are divided into sections, the heading being given in three languages. We notice a number of references to papers dealing with illumination, physiological effects of light, colour vision, etc.

* *Illum. Eng.*, August, 1927, p. 227.



The International Illumination Commission

The gathering of delegates to the session of the International Illumination in Bellagio (Italy) took place last month. The session was well attended by foreign delegates, Germany being particularly well represented, and a useful opportunity was afforded of meeting leading experts on illumination abroad. Numerous important decisions were taken, and several of the papers read were of considerable interest. We shall be commenting more fully on the proceedings in our next issue.

Principles and Promotion of Modern Lighting

A paper on the above subject was recently read by Mr. J. E. Roding before the South African Institute of Electrical Engineers. Mr. Roding described a recent touch in the United States, where he studied the work of the two main Lighting Service Departments at Nela Park, Cleveland, and at Harrison, New Jersey. In his paper he also illustrated the well-known demonstration "Lichthaus" of the Osram G.m.b.H. in Berlin.

After dwelling on the main principles of good lighting, Mr. Roding pointed out that the encouragement of a public demand for good illumination is beneficial to all sections of the electrical industry. "The incandescent lamp," he remarked, "of course, constitutes only a very small portion of the electrical business generally. If we consider that a lamp costs about 1s., then the value of the switches, wires, fuses, conduit, fittings, etc., contingent upon the use of the lamp amounts to about twenty times as much, i.e., 20s. And if the lamp lasts 1,000 hours it will consume about 20s. worth of electric current at the normal rates. It will thus be seen that every additional new lamp sold entails forty times its value in the shape of wiring material and electric current."

Here, surely, is a convincing statement of the value of the illuminating engineering movement to all sections of the industry. All these sections—makers of switches, wires, conduit, etc., besides the lamp-makers, should take their share in the support of the movement by which they benefit.

Searchlight Illumination to Welcome Captain Courtney

The New York Edison Company is stated to have prepared special lighting effects to welcome Capt. Courtney on his arrival after flying the Atlantic. A landing space half a mile long and a quarter of a mile wide was set aside, and this area was marked by four ferry boats carrying searchlights with an aggregate rating of over 10,000,000,000 candle-power. On the crown of the famous Statue of Liberty a large beacon light was mounted to guide the aviator on his arrival at night. Another beacon was erected on Governor's Island. Altogether searchlights yielding over 18,500,000,000 candle-power were provided. At the time of writing it seems probable, however, that Captain Courtney's flight will now have to be deferred until next year owing to unfavourable weather conditions.

Artificial Daylight and Eyestrain

There is a general recognition that, apart from the intensity of illumination necessary for reading, the colour may also be of importance. There are some in this country who contend that for close work artificial light approximating to daylight in quality is advantageous. It is suggested that the eye, being habituated to daylight, can accommodate to "artificial daylight" more easily than to uncorrected artificial illuminants, in which red and orange rays predominate. This impression seems to be supported by some investigations recently carried out by the Bureau of Standards, Washington, mentioned in *The Electrical World*. In one case a person who had for some years experienced discomfort and headaches, etc., as a result of reading by artificial light, found that the trouble disappeared when artificial daylight was substituted. No doubt individuals differ considerably in this respect. But in cases when there are symptoms of eye fatigue following evening reading the substitution of some form of artificial daylight deserves a trial. It should, of course, be ascertained that the lighting unit does really furnish light resembling daylight sufficiently closely to be of benefit, as the mere visual appearance of the light is not always an adequate guide.

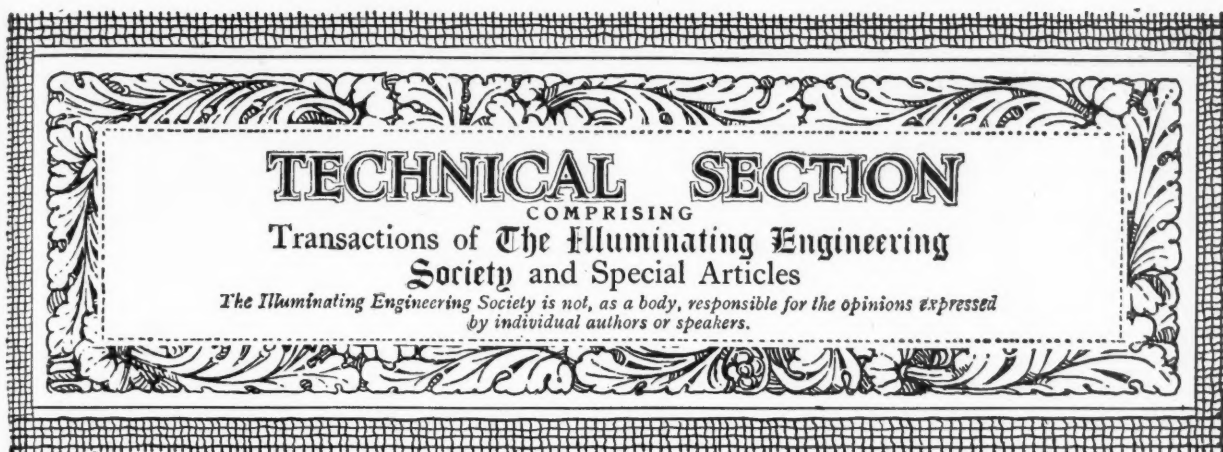
The Zeiss Planetarium

Mr. W. B. Barker contributes to *The British Journal of Physiological Optics* a description of the Zeiss "Planetarium"—a very clever apparatus for demonstrating the chief facts of astronomy and the motions of the heavenly bodies. In referring to the exhibit of this apparatus at the Gesolei Exhibition in Düsseldorf some months ago, we expressed the hope that a planetarium might be secured for London. The General Purposes Committee of the London County Council recently considered this question, but apparently have decided not to go to the expense of installation. It is true that the cost of such an instrument is about £20,000. But it is stated that in such towns as Hanover, Leipzig, Cologne and Berlin the planetarium has proved to be a practical proposition, with an entrance fee of about one shilling.

Upwards of a dozen planetarium buildings have been erected in the larger towns of Germany, and have proved such an attraction—not only to students of astronomy and school children, but also to the general public—that each day of the week some three displays are given, with a lecture of about one hour's duration on each occasion. It may well be asked, in view of this experience abroad, if it is really impracticable to have a single planetarium building in England. It is to be hoped that before long some municipal body will prove sufficiently enterprising to enable people in this country to have an opportunity of seeing the apparatus in action.

Street Lighting in Japan

We understand that a special committee has been formed by the Illuminating Engineering Society in Japan to study the question of street lighting. Information is now being acquired regarding the lighting of cities in Europe, and the results of this enquiry will be awaited with interest.



Institution of Public Lighting Engineers

Fourth Annual Conference and Exhibition (Held in Brighton, September 12th-15th, 1927)

THE fourth Annual Conference of the Institution of Public Lighting Engineers, held in Brighton during September 12th to 15th, was an interesting and enjoyable event. Brighton, in common with most other sections of the British Isles, was unfortunate as regards weather conditions. But in other respects it showed to advantage and maintained its title of the "Queen of Watery Places."

On arrival on Monday visitors assembled at the Corn Exchange (Pavilion Grounds), where the Exhibition of Street Lamps and Lighting Appliances was opened by the Deputy Mayor of Brighton (Councillor J. Lord Thompson). In his address of welcome Councillor J. Lord Thompson expressed his belief in the importance of such conferences and in the holding of exhibitions where both gas and electric lighting were represented. Mr. C. S. Shapley (Leeds) proposed a vote of thanks to the exhibitors, on whose behalf Mr. Philip Sugg responded. A vote of thanks to the Deputy Mayor for opening the exhibition was moved by Mr. R. Davison (Newcastle-upon-Tyne).

Visitors then spent an interesting time examining the exhibits and greeting acquaintances. It was generally agreed that manufacturers had collected a very representative display, over 20 firms participating. Another opportunity of studying the exhibition in detail was afforded on Wednesday, September 14th, when there was again an excellent attendance. Readers will find on pp. 287-294 an illustrated account of the display.

OPENING OF THE CONFERENCE.

The conference was formally opened on the following morning by the Deputy Mayor, who extended an official welcome to the delegates. In the course of the formal business that followed it was mentioned that, as a result of conferences with the Board of Trade and consideration of the suggested Articles of Association, it was considered expedient that the name of the body should be altered to "The Association of Public Lighting Engineers" (instead of "Institution").

The new President (Mr. Alex. C. Cramb, Electrical Engineer and General Manager, County Borough of Croydon) was then introduced and subsequently delivered his address, reviewing the present position of public lighting and commenting on various modern problems. Following the address, the paper by Messrs. L. B. W. Jolley, J. M. Waldram and R. Watson on the Standard Specification for Street Lighting was read, and an interesting discussion followed.

LUNCHEON AT THE PAVILION.

Members then adjourned to luncheon at the kind invitation of the Chairman (Mr. A. M. Paddon) and the Directors of the Brighton and Hove General Gas Company, in the Banqueting Room, Royal Pavilion. This proved to be a very enjoyable event. The toast

of "Our Civic Authorities" was proposed by Mr. Paddon and responded to by the Deputy Mayor of Brighton (Councillor J. Lord Thompson), the Mayor of Bournemouth (Alderman H. J. Thwaites) and Alderman A. Wilkie (Newcastle-upon-Tyne). The toast of "The Institution of Public Lighting Engineers" was proposed by the Mayor of Croydon (Councillor A. J. Camden Field), and responded to by the President (Mr. A. C. Cramb). In the course of his address Mr. Paddon referred to the Board of Trade statistics as showing how, when gas and electricity were under common control, both made exceptional progress, whilst Councillor J. Lord Thompson pointed out that, although in Brighton the gas supply was privately owned, where the electricity supply was municipal both had flourished in friendly rivalry. The President also alluded to the friendly relations existing between gas and electrical engineers, and up and down the country they would be found helping each other and making suggestions as to how they could mutually assist in bringing about the best results for the public.

VISIT TO GAS AND ELECTRICITY WORKS.

The afternoon was occupied in visiting the Brighton and Hove General Gas Company's works at Portslade and the adjacent Brighton Corporation Electricity Works at Smethwick. The visit to the gasworks was excellently arranged, and a good opportunity was afforded of seeing all the sequence of operations—the retort houses, the exhauster houses, the rotary scrubbers and purifiers, and finally the huge meter with a registering capacity of 200,000 cubic feet per hour. The present output of gas amounts to about 2,000 million cubic feet per annum. These works were established in 1870, but the Brighton and Hove General Gas Company had even then been established for 45 years, so that it has now passed the limit of 100 years of existence.

Under the guidance of Mr. John Christie, the Electrical Engineer, visitors also inspected the electricity works, and were much impressed by the general simplicity of the arrangements and the apparent ease with which the large turbo-generators supplied Brighton with its electricity supply.

THE INSTITUTION DINNER.

There was again a large assembly for the Institution dinner, which, like the luncheon, was held in the Banqueting Hall of the Pavilion. On this occasion the toast of "The Institution of Public Lighting Engineers" was proposed by Councillor Anthony Oates, late Lord Mayor of Newcastle-upon-Tyne, who was one of the original twelve members who gathered in Holborn to inaugurate the Institution. Mr. Robert Davison, also of Newcastle, and a past-President, responded. Other toasts included "The Visitors," "The Corporation of Brighton," and "The President," the latter being proposed by Mr. H. Dickinson (Liverpool).

On the following morning the President and Council and other members met in order to place a wreath on the Cenotaph, after which two further papers were read and discussed. Mr. John Christie described the main features of the public lighting of Brighton, and Mr. R. L. Matthews, Chief Constable of Leeds, dealt with "Road Traffic and Public Lighting as seen by a Chief Constable."

The afternoon of Wednesday was set apart specially for the inspection of the exhibition, and there was a general feeling amongst exhibitors that this arrangement had been advantageous, and that a better opportunity had been afforded of doing justice to the display than at the last conference.

Having thus given a general summary of the proceedings, let us now consider the various papers and the ensuing discussions in fuller detail.

PRESIDENTIAL ADDRESS.

In his opening remarks THE PRESIDENT (Mr. Alex. C. Cramb) pointed out the field for useful work by the Institution. The President of last year, Mr. Davison, had endorsed the view held by other experts, that there had been, on the whole, little general improvement in the standard of street lighting since 1914. Yet in the same period great progress has been made in other fields of lighting. The unsatisfactory condition of things is emphasized by the rapid increase in motor traffic. Large sums of money have been expended in the construction and improvement of roads. But the Ministry of Transport do not seem to realize that the illumination of these roads is equally important.

The Standard Specification for Street Lighting should prove a milestone in the development of thoroughfare illumination. No doubt modifications will be required, but meantime it should improve the general standard of street lighting. Mr. Cramb suggested, however, that there was a tendency to emphasize a standard much in excess of that in the existing best lighted thoroughfares. Such streets as Whitehall and Oxford Street, which come appreciably down the scale in the specification, seem to be already amply illuminated. What is of real importance is the improvement of lighting in the enormous mileage of less important thoroughfares throughout the country. It is also most important that there should be no sudden change in the degree of illumination in entering one thoroughfare from another. Illumination should be so graded as to avoid these sudden changes.

Much might be done towards the evolution of the most efficient types of fittings for various classes of thoroughfares. Owing to the obsolete construction and design of many street-lighting fittings, and to the varied distance apart of the standards, rapid changes in the degree of illumination along the road surface are usual, and this renders driving difficult. It would seem that the cost of illumination of all thoroughfares in which there is any considerable road traffic should be contributed from two sources. There is the expenditure which the local authority would properly provide for the reasonable illumination of thoroughfares in order to ensure public safety; but this should be supplemented by a proportion of the funds subscribed by the motor owners through taxation, so as to meet the extra expenditure necessitated by motor traffic conditions. Strong protests have been raised against the diversion of the Road Fund for purposes for which it was never intended; the present deplorable state of the lighting of the majority of thoroughfares in the country, as well as the large amount of work on road maintenance, is no doubt a result of this course of procedure.

The modern tendency is to place the control of public services under one central board of experts, and the illumination of thoroughfares seems so essential a matter that it should come under properly centralized expert control. The artificial boundaries of local authorities lead to a great variation in the standard of illumination. There should be standardization not only of the degree but of the efficiency of illumination. But such variations are not confined to roads passing through the areas of several authorities. They occur even within the area of a single authority, probably owing to lack of co-ordination of the different departments.

In conclusion Mr. Cramb gave instances of the utility of modern reflecting and refracting devices in levelling up the degree of illumination. Tests made in one of the chief Croydon thoroughfares showed that with 450-watt fittings spaced 110 feet apart, the maximum illumination was 0.87 foot-candles and the minimum 0.28. Whilst not representing the maximum effect that might be obtained they showed the advantage of suitable directing devices, and in this case they had been applied without in any way detracting from the appearance of the lighting units. Finally Mr. Cramb referred to the design and regulation of luminous signs for traffic control, which constituted another field for useful work by public lighting engineers.

THE BRITISH ENGINEERING STANDARDS ASSOCIATION DRAFT SPECIFICATION FOR STREET LIGHTING.

The paper presented by Messrs. L. B. W. JOLLEY, J. M. WALDRAM and R. WATSON on this subject was of a somewhat technical character, and owing to the variety of formulae and diagrams included does not lend itself very readily to abstraction. In the introduction the authors summarized the steps leading to the formation of the B.E.S.A. sub-committee on street lighting and enumerated the bodies represented thereon. The specification now presented is, so far as British practice is concerned, the second of its kind. The first was outlined in the paper entitled "Standard Clauses for Inclusion in a Specification for Street Lighting," read before the Illuminating Engineering Society in 1913. These clauses were drawn up by a committee representing the Illuminating Engineering Society and the Institutions of Gas, Electrical and Municipal and County Engineers. The grades for minimum illumination ranged from 0.01 to 0.10 foot-candles, measured on a horizontal plane 3 ft. 3 in. above the ground. This specification doubtless represented the views of that day on street lighting. But much has happened since and the present specification is more fully adapted to modern requirements. It suggests higher values of illumination and provides for better and more uniform illumination by clauses covering the heights of standards for the various classes and their spacing in relation thereto. In addition some attempt is made to obviate the possibility of objectionable glare. The specification has received sympathetic support in principle and helpful criticism in detail. The chief alterations adopted as a result of such discussions are:

(a) The substitution of the term "test-point" for "mid-span point," such test points being shown in plans of typical installations.

(b) The addition of a class "H" grade of installation having a rated mean point illumination of 0.01 foot-candles for residential and open streets where through traffic is not ordinarily expected.

(c) Some variation in the tolerance in illumination under rated conditions, and

(d) The modification of the apparently mandatory character of the glare clause.

(The most important clauses in the specification were reproduced in an appendix to the original paper.)

Following these introductory remarks the authors presented an analysis of the chief variable in a street-lighting installation, showing how the consideration of these factors led to the method of dealing with glare. The fundamental equations for calculating the illumination derived from a light source at a distance are presented, and supplementary expressions for "staggered" one-way, central or double-side spacing are given.

It is pointed out that the Committee selected the horizontal mean test-point illumination not as a criterion of excellence but as a method of classifying installations. The correlation of these various grades with different types of thoroughfares was found impracticable at the present time. The classes, however, aim at illuminations distinctly higher than those ruling to-day, and Class A (2.0 foot-candles) may be considered spectacular according to modern views.

The minimum heights proposed for the various classes are designed to set a limit to glare. As heights are increased glare is diminished, but at the same time the illumination in the street is also reduced. Therefore a compromise is necessary.

The spacing ratio is of extreme importance in determining the variation in illumination along a road. A high value of the ratio of spacing distance to height leads to considerable diversity and a low minimum, so that it is usually necessary to accentuate the candle-power at angles somewhat below the horizontal. Careful focussing of the lamps is then necessary, and severe glare may result from imperfect adjustment. A low value for the ratio leads to more favourable conditions in the above respects, but it involves either high posts or a large number of them, and is therefore costly. Here again compromise is necessary.

It is next pointed out that the visibility of any object in the street depends mainly on its contrast with surroundings, and the relation between contrast and the spacing-height ratio is investigated. It is remarked, however, that such expressions must be applied with considerable reserve and that their application is affected by many conditions, such as the nature of the road-surface.

This leads to a discussion of glare and visibility. The fundamental basis of the treatment of glare in the specification is a method devised by Walsh, which in turn is based on the experimental work of Bordoni. A curve is presented showing the relation between field brightness and the coefficient of perceptibility, and a family of curves connecting coefficient of visibility and glaring illumination on the eye is also presented for the series of classes of installations "A" to "H." (Only one of these curves was actually obtained by Bordoni; the others have been calculated.) In another diagram the relation between coefficient of visibility and the angle at which the incident light reaches the eye is indicated. Naturally visibility improves with the angle, as glare becomes less when sources are removed from the normal range of view. Bordoni's results, however (in which glare is regarded as affected by candle-power rather than intrinsic brilliancy of lighting units), were not applicable to sources of light subtending a greater angle than 3° at the eye.

In the calculation of perceptibility a number of assumptions have to be made, e.g., that the reflection factor of the road surface (assumed to be matt) is 10 per cent. In practice road surfaces may become shiny by reason of traffic or wet. Experiments on the problems of glare are still proceeding. For the moment a method has been devised and explained in the specification which enables the glare factor "G" for an installation at any particular angle to be calculated. At present the minimum value which is considered glaring corresponds to a maximum value of G of 10.

After briefly discussing the selection of the "test-point," the nature of tests, and the distinction between rated and service illumination, it is pointed out that the specification attempts to fulfil a threefold obligation:

- (1) The purchase of a scheme of lighting for any defined class on sound scientific lines by the street lighting authority from manufacturers of appliances.
- (2) The maintenance of such an installation by the street-lighting authority for the public.
- (3) The education of all concerned in problems of street lighting.

In conclusion the authors present an interesting record of attempts to place in order of merit 13 typical London thoroughfares. The order was decided by three methods: (a) by calculation, (b) by opinion of the observers, and (c) by experiment, and the three methods led to closely concordant results. This is considered to afford confirmation of the general correctness of the methods pursued in the specification.

Discussion.

The discussion was opened by MR. R. WATSON, who remarked that this was one of the first occasions on which gas and electrical interests had been associated in the production of a joint paper. The presentation of the specification in draft form for discussion had led to much useful criticism, and those responsible for the specification would welcome further suggestions from those present.

MR. J. M. WALDRAM referred to some slides he had brought with him illustrating the effects of reflection in

streets under wet and dry conditions. The photographs illustrated the important influence exercised by the shiny surface of streets, which made it necessary to modify conclusions that might be drawn from distribution of illumination alone. The direct reflection of light from street surfaces was of importance in relation to the positions assigned to lighting units; reflections of rays might give rise to glare, and on the other hand part of the street might be left in apparent darkness.

MR. J. F. COLQUHOUN (Sheffield) attached great importance to the specification. The adoption of 13 ft. as the minimum height of suspension was an important step. On subsidiary roads 11½ ft. was at present the usual height, and the extension to 13 ft. would cost about 10s. to 15s. per post. Nevertheless he was prepared to recommend the change. Mr. Colquhoun also referred to the lighting of footpaths on new roads, where there were often grass margins between the roadway and the footpath. If measurements were taken on the curb line apparently the footpath might be left in darkness. The footpath should be considered as a distinct lighting proposition. He had been much struck by the differences in opinion expressed in regard to glare, and the matter evidently required further consideration.

MR. HAYDN T. HARRISON recalled the discussion of Mr. Trotter's paper in 1913. Much had happened since then, but it had always been difficult to secure marked advances in street lighting. Mr. Harrison also alluded to figures obtained as far back as 1891; it was curious that even in that year there were some streets with lighting equal to that adopted to-day. At present progress was apt to be local. In small areas advances were made, but bad lighting remained in many thousands of miles of streets. One circumstance that affected modern lighting was the changed nature of the road surface. A road with the present dark tarred surface appeared less brightly lighted than a macadamized one. This affected judgment by general impression of brightness, which was not always a reliable guide. He noticed that in the tests described by the authors the most brightly lighted streets did not come out at the top. The specification should prove a distinct help to advances in street lighting, and he hoped that public lighting engineers throughout the country would make good use of it.

MR. E. J. STEWART (Glasgow) remarked that the paper might appear formidable, but the terms of specification itself, though based on mathematical formulæ, were simple. He agreed with Mr. Colquhoun's remarks on footpath lighting. In regard to glare he had not received many complaints from motorists, and he attributed this mainly to the fact that the eyes of motorists were necessarily fixed on the road, so that they did not look direct at the light sources.

MR. J. S. DOW recalled the controversy that had taken place regarding methods of measuring illumination in streets, following Mr. Trotter's paper. The authors had explained that the measurement of minimum illumination at the test point was a basis of classification rather than a criterion of excellence, and he (Mr. Dow) agreed that if a single criterion was desired the minimum illumination test was probably the best. Nevertheless public lighting engineers who endeavoured to apply the specification would probably have to meet the objection that the greater part of the light furnished in a street was disregarded; two streets might fall in the same class, yet one might not only appear but actually be much more brightly lighted than another so far as the illumination of the street as a whole was concerned.

In view of the adoption of minimum illumination it would surely be questionable to limit the diversity factor and thus penalise the contractor for supplying more light! But it would have been helpful if the rate of change of illumination could be limited, thus avoiding the sharp contrasts to which the President had referred. The attempt to assess glare was an enterprising effort, but, he thought, still in the experimental stage. He doubted whether the laboratory results ascribed to Bordoni could be strictly applied to street lighting, and he hoped that the use of a formula based on candle-power only would not be interpreted to mean that it was unnecessary to use diffusing lanterns. With reference to Mr. Waldram's remarks on direct reflection

from wet streets, he might mention that he had recently heard from a public lighting engineer abroad who had found that central suspension gave rise to considerable glare in this form. Diffusing lanterns would probably help to remedy the trouble.

MR. L. GASTER mentioned that he had just returned from the meeting of the International Illumination Commission at Bellagio, where the subject of street lighting was discussed. Procedure in regard to standards in the United States and Germany differed somewhat from that in this country, and further exchange of views on the subject was needed. He thought that a certain amount of educational work was necessary in order to render the specification generally understood. It would be an excellent plan if sections of road could be set apart for model installations, showing methods of complying with requirements for the various classes of streets. Public lighting engineers could then judge the effect and form an estimate of the cost.

MR. H. DICKINSON (Liverpool) agreed that better street lighting was needed in view of the great increase in motor traffic. The discussion of the draft specification had evidently proved useful, and he was glad to hear that this had led to certain modifications. The specification should have a useful influence in promoting uniformity, though it must be recognized that circumstances differed very greatly in districts. He regarded the elimination of glare as one of the most important problems. The raising of the height of lamps was a helpful step in this direction, but he considered that the efficient screening of the light source was also important.

CAPT. E. STROUD emphasized the importance of even illumination. In connection with Mr. Dow's remarks he pointed out that in practice no street could be lighted with absolute uniformity. Even under the most favourable circumstances the diversity coefficient must be high, so that in practice the estimation by minimum illumination gave a fairly good indication of the lighting of the street as a whole. He thought that the paper rather emphasized the difficulties that might arise in the use of directive appliances but no doubt they did not mean to imply that directive appliances should not be used.

MR. E. FRYER (Deputy Secretary of the Automobile Association) supported the proposal that demonstrations of lighting, carried out in accordance with the specification, should be put in hand as quickly as possible.

The PRESIDENT (Mr. A. C. Cramb) remarked that some speakers had pointed out possible defects in the specification and seemed to be rather apprehensive that it was now in final form. A perfect specification was not attainable in practice, but the present specification was good enough to serve as a working basis, and it was only by applying it in practice that the experience which was a necessary preliminary to improvements could be gained.

Authors' Reply.

MR. R. WATSON expressed, on behalf of the authors, their appreciation of the kind reception given to the paper. He was glad to find a general recognition that the specification as a whole was a useful document, which should lead to further improvements. He (Mr. Watson) was one of the members of the committee who had supported the inclusion of the Class H, with a minimum illumination of 0.01 foot-candles. There were many residential streets to which this could fitly be applied, and where local authorities could not afford to provide illumination of higher class. Mr. Watson also recalled that in 1913 he was one of those who opposed the adoption of minimum horizontal illumination. His views had not entirely changed, but he had accepted the method because he now felt that for general purposes it was probably as good as any other that could be suggested.

Mr. P. J. M. Waldram replied to some of the chief points raised in the discussion.

MR. J. M. WALDRAM first mentioned the addition of a further "Class H" installation in Table I of the specification. Some speakers had implied that this was

not a grade worth inclusion. But there were many residential side-roads never used for fast-moving traffic which did not previously come within the purview of the specification. In such cases, with a spacing of 150 ft. lamps of about 200 candle-power were commonly used, and afforded reasonably good illumination, probably sufficient for the purpose. It was doubtful whether many authorities could afford to provide more for such roads. Whilst under service conditions the illumination might be under 0.01 foot-candles, tenders would have to provide a higher illumination than actually specified in order to ensure that test conditions are satisfied.

In regard to the minimum height of 13 ft. for classes G. and H, the specification provided for what was considered desirable, rather than for existing practice. In most cases there was no great difficulty in fitting extension pieces until columns could be replaced. Mr. Colquhoun had raised an important point in regard to arterial roads with a wide grass edge between footpath and kerb. This seemed to require special definition under clause 10.

Several speakers had referred to the glare test. This test was undertaken solely in order to see if there was any experimental justification for the method of assessing glare. In the comparisons of streets included in the paper order of preference was based solely on glare and not on other factors which might affect the general excellence of the installation. Mr. Dow had pointed out that the problem of glare was imperfectly understood and suggested that many assumptions rendered the validity of the method questionable. It would be at once agreed that much remained to be done on this subject. But results indicated that there was a connection between the theoretical and the practical side of the problem. Appendix IV dealing with glare might appear long in comparison with the more important sections of the specification; but it was necessary to choose between omitting all reference to glare and including the data necessary for a reasonable figure to be worked out. The treatment was inevitably lengthy in view of the complexity of the problem and the many variable factors. As Mr. Colquhoun and Mr. Stewart had pointed out glare was usually more evident to pedestrians than to motorists, because the latter were more or less compelled to confine their axis of vision to the horizontal.

The vexed question of diversity had been raised by several speakers. The authors inclined to the view that where the minimum illumination is fixed there were some advantages in a reasonable diversity. In the cases mentioned by Mr. Dow it was difficult to see what disadvantage was entailed in the increased illumination accompanying the greater diversity.

Mr. Dow and Mr. Dickinson had advocated the use of diffusing glassware, and on general grounds considerable advantage attended its use. Yet it had been found that if the complete source subtended less than 2° or 3° at the eye, the use of a diffusing globe did not increase ability to perceive objects on the road, except in so far as it reduced the candle-power of the source in the direction viewed. Possibly, however, the use of a diffusing globe might reduce the discomfort of glare without appreciably affecting ability to see.

Mr. Stroud had suggested that minimum illumination was a fair indication of excellence. Whilst it was broadly true that if the minimum illumination was correct the rest would (with normal equipment) follow, yet it must not be overlooked that there were other factors, such as the positions of the light sources, which contributed to the effectiveness of the installation.

The paper was not intended to imply that the authors were in any way opposed to directive equipment, but merely that with a spacing ratio of 12 to 1 or more the correct focussing of such equipment necessarily becomes critical.

It would be interesting to have an investigation into the cost of complying with the requirements for different grades, as Mr. Gaster had suggested, and the proposal that demonstration streets might be fitted up was a good one. Such demonstrations would be of great

value in enabling the appearance of a finished installation to be appreciated.

As the President had remarked no specification could ever be perfect, but the present specification afforded a good working basis. No doubt modifications might be suggested by further experience, and it would be most interesting to see how it worked in practice.

STREET LIGHTING IN BRIGHTON.

On the following morning MR. JOHN CHRISTIE read his paper entitled "Notes on Street Lighting in Brighton." Mr. Christie recalled that Brighton had been a pioneer in many ways and had installed an experimental lighting plant as far back as 1881. The municipal electric supply was inaugurated in 1891. The cast iron posts erected on the front 35 years ago were considered excellent examples of the founder's art and were still just as good as when first erected. Only slight modifications had been necessary to facilitate the adoption of gasfilled lamps and modern designs of lanterns. The more important streets were dealt with in turn, and to-day the great majority of the streets are electrically lighted. He added that although the keenest rivalry existed between the gas company, which was privately owned, and the municipal electrical undertaking, they were good friends, always respecting each other's interests and apparently both obtaining as much new business as they could cope with.

Mr. Christie referred in some detail to experiences during the war when the lighting of Brighton, as a coast town, was "blacked out," and to the state of disrepair in which lighting units were left after the armistice. Rates were high and money was scarce, and for several years progress was difficult. As funds permitted, lamps of higher candle power in appropriate modern lanterns were substituted for the original arc lighting equipment. In the side streets old types of fittings were still used to some extent, but, considering the circumstances, the lighting even here compared favourably with that in most towns he had visited.

In the Valley Gardens "White-way" lighting with opalescent globes had been adopted. The system was very effective, but might be improved by doubling the wattage and using gasfilled lamps. For lighting the refuges in the centre of the town an effective form of fitting manufactured by a local firm had been adopted. On festival occasions special decorative lighting had been provided. As temporary equipments they were costly to maintain, but it was proposed to establish a scheme of a permanent character, involving underground wiring with suitable disconnecting switch control boxes. Floodlighting had been applied to the War Memorial and the Royal Pavilion—the latter executed in coloured light most effectively on the occasion of the visit of the Electrical Contractors' Association in 1926.

Mr. Christie mentioned that during his recent visit to the United States he had been impressed by the adoption of coloured signal traffic control on a large scale. With the usual arrangement of streets intersecting at right angles in American towns, this method had proved highly effective. But in this country, owing to the narrow and tortuous streets in our older cities and towns, it was less easily applied. Nevertheless it might prove of considerable value at important traffic centres, especially those manually operated by the officer in charge.

In conclusion Mr. Christie gave figures for the cost of maintenance of the public lighting system in Brighton. The total rate for lighting the town worked out to the low figure of 4.5d. in the £. Thus a ratepayer assessed at £50 paid only about 1.5d. a day towards the cost of lighting the streets of Brighton, and it would be agreed that he got an excellent return.

Discussion.

The discussion was opened by MR. H. DICKINSON (Liverpool), who congratulated Mr. Christie on the

development of public lighting in Brighton. There were some good examples of lighting to be seen. As Mr. Christie had mentioned, some of the equipment in the side streets was of rather ancient date, and no doubt still better results would be obtained in course of time, when more modern appliances could be introduced.

MR. LENNOX (Newcastle-on-Tyne) and MR. J. S. DOW congratulated Mr. Christie on the lighting of the Parade, though the latter suggested that the effect would have been even better if diffusing glass globes were mounted on the ornamental pillars. The effect was always unsatisfactory when an imposing post terminated in a bright speck of light, and the exposure of bare filaments, even at this height, was apt to give an impression of glare. Mr. Dow also suggested that there might be opportunities for commercial floodlighting in Brighton—it might, for instance, be adopted by some of the large number of hotels along the front. Mr. Lennox was rather inclined to criticize the method of charging at a fixed price per lamp per annum. He suggested that "all-night" lighting might be encouraged by special rates.

MR. L. E. BUCKELL expressed approval of the lighting of the boating pool on the front, and referred to the "White-way" lighting in the Valley Gardens and the system of lighting refuges as distinctive efforts. He received the impression that Brighton throughout was adequately lighted, and the lighting rate (4.5d. in the £) was surely very low. The average resident in Brighton thus spent much less on public lighting than on tobacco, and certainly received a good return for this small expenditure.

There was a tendency in public lighting, as in domestic lighting, to think that everything must be done with the lowest possible expense, and to overlook the very great advantages derived in return.

MR. S. B. LANGLANDS (Glasgow) also congratulated Mr. Christie on his paper and mentioned that the present lighting rate in Glasgow was 8d. in the £. The permanent rate was usually between 6d. and 7d., but at the present they were suffering the effects of the disastrous coal strike last year.

Although Mr. Christie had been enterprising in the lighting of Brighton he could not help feeling that the rate mentioned was low for such an important town, and more might be expended. He disagreed with Mr. Lennox's suggestion that the charges by the supply undertaking should be graded according to the period of night for which light was required. This would unduly complicate the accounts. Public lighting was in general an "off-peak" load and therefore valuable. In Glasgow shopkeepers were encouraged, by the granting of a special rate, to keep their window-lighting on after 11 p.m.

MR. BIRKETT (Southend-on-Sea) referred to the economies derived from the use of time-switches, and MR. DAVISON (Newcastle-on-Tyne) stated that automatic control had effected a saving of 50 per cent. in wages in that city.

The PRESIDENT mentioned that he had utilized time-switches for lamps in isolated positions many years ago. At that time they had caused trouble owing to lamps being left burning after hours, and they were found to be rather subject to changes in temperature. He believed, however, that they had been much improved during recent years.

After several others had joined in the discussion MR. CHRISTIE briefly replied, and in doing so exhibited a drawing of the new type of ornamental standard, bearing the Brighton coat-of-arms, which he was recommending for adoption. It is understood that diffusing glass lanterns will be adopted for these posts.

Mr. Christie stated that his experience of time-switches had been somewhat similar to that of the President. As regards tariffs for lighting he had always aimed at simplicity and considered a single rate to be the best.

STREET LIGHTING AND TRAFFIC.

MR. R. L. MATTHEWS, O.B.E. (Chief Constable of Leeds), then read a paper entitled "Street Lighting and Traffic Problems as Seen by a Chief Constable." He pointed out that street lighting was originally installed mainly for the protection of the public. There was no doubt that the continual improvement in street lighting had been a potent factor in diminishing crime, but to-day the chief functions of lighting had been profoundly modified by the great growth in high-speed motor traffic. Methods of lighting were naturally influenced by the lay-out of the city. Leeds, with a population of 460,000, was called upon to light 587 miles of streets, and there were some 18,000 street lamps. Special "Caution" and "Danger" signs had been fixed at approaches to dangerous corners. The value of such devices, however, depended greatly on their design and judicious application. Another recent installation of two white lights, supplemented by an intermittent red light, mounted on a refuge at a very busy spot, had proved of great benefit to motorists and pedestrians.

Mr. Matthews then proceeded to enumerate some of the chief points in good street lighting, which included even illumination; absence of glare and troublesome shadows; uniformity in regard to height, distance apart and power of lamps; the illumination of danger and direction signs at nights; the use of supplementary lights on posts at important crossings and junctions, so as to avoid accidental collisions, etc. He believed that on the whole the best form of street lighting was by means of overhead lights, centrally fixed. This system safeguarded the police officer on point duty, besides having practical advantages. Instances were given of cases where departure from the normal arrangement of lights had proved dangerous to traffic. When a sudden turn in a road occurs it is important to guard against motorists being misled into thinking that the road goes straight on between two lamps on one side of the road. Another problem was to render officers on point duty easily visible. White capes, sleeves, etc., were sometimes provided to aid visibility; but in certain cases, e.g., when lights were reflected in the surfaces of the adjacent area of the road, this step might prove a hindrance to visibility.

Obstructions on highways are at present illuminated by red lights, irrespective of whether the obstruction is on the off or near side of approaching traffic. Mr. Matthews suggested that this was a real source of danger. A red light is generally regarded as an indication that the obstruction should be passed on the off side. But if the obstruction is already on the off side of the road this may easily result in collisions. He therefore suggested that when an obstruction is on the road the oncoming traffic should be warned by a red light being placed on the extreme point of the obstruction nearest the centre of the road, and that a white or, better still, a green light should be displayed at the other end nearest to the centre of the road, so as to warn traffic proceeding in the opposite direction.

Road lighthouses, usually in the form of posts fitted with red reflectors which catch the beam of medium-powered headlights at a distance of 200 yards, are of considerable aid to traffic, and of great service at unlighted junctions, etc.

Finally reference was made to the results of inconsiderate use of headlights. The dimming of headlights when approaching another car might usefully be considered, and the practice during the war of having the upper portion of the headlight obscured might also be introduced again. It was also suggested that an auxiliary light might with advantage be fixed under the running board of cars or under the near side dumb iron as low as possible and focussed on to the side of the road. This additional light would not interfere with the comfort of drivers of oncoming vehicles, and would assist the traffic constable.

The practice of keeping on the lighting of shop windows after business hours aids the police in supervision, and furnishes useful additional light in the streets. Street illumination should be maintained to a limited extent up to the hour of daybreak. Although considerable improvements in street lighting have been made

during recent years there is still room for improvement. In this connection it is hoped that co-operation with chiefs of police will be developed, as public lighting is a question of great importance to the police in relation to the control of traffic, the prevention and detection of crime, and the safeguarding of property.

Discussion.

In the subsequent discussion ALDERMAN TAYLOR (Bolton) suggested that some form of luminous indicators might be mounted on the rear of trams and buses so as to indicate to vehicles behind when they were about to turn. He also emphasized the importance of proper directional lighting and the selection of correct positions for lighting units. Motorists were apt to find the shadows cast by some street lamps very distracting.

The PRESIDENT emphasized the importance of co-operation on the part of authorities and institutions in order to obtain uniformity of methods in the use of luminous signals for traffic control. This point was also stressed by Mr. Adams (Chairman of the Lighting Committee, Edinburgh), who urged the Institution to draw up a uniform scheme which, after full discussion, should be submitted to the Ministry of Transport.

Mr. RYAN (Automobile Association) suggested that when automobiles were parked in the street they should always face the "on" side of the road. MR. L. GASTER referred to the discussion of regulations for motor headlights at the gathering of the International Illumination Commission in Geneva. This subject is being considered by a technical committee. Meantime it has been decided that headlights should not be "dimmed" when another car is approaching, but that headlights with a depressed beam, based on the use of dual filaments, should be adopted. Mr. Gaster also referred to statistics of street accidents as recently discussed in *The Illuminating Engineer*. These showed that, whilst all forms of street accidents were increasing, the rate of increase for accidents by night was considerably greater than that for day accidents. This surely furnished an indication of the importance of better public lighting. He strongly urged that officers should be instructed to report on the conditions of street lighting at places where accidents occurred by night. Information so acquired would furnish a strong argument in favour of adequate street lighting, and would enable unsatisfactory lighting conditions that were responsible for accidents to be traced and remedied.

In the course of the proceedings the retiring officers and members of the Council were reappointed, and Mr. H. Dickinson (Chief Engineer and Manager of the Liverpool Electricity Supply Co.) was elected a Vice-President.

An invitation to hold the next annual conference in Sheffield was accepted, an arrangement which is rendered specially appropriate by the fact that Mr. Colquhoun, the lighting engineer in that city, is the next President.

Illuminated Road Signs

There is, in this country, a growing array of signs of one kind and another, enjoining us to go there and come here, to do this and not to do that; but with the coming of darkness most of these injunctions disappear. That is not, of course, the real intention, but as they are generally invisible at night they obviously cease to be effective. We know of quite a number of nice enamelled signs bearing such requests as "Please drive slowly through the town," the reverse side of the sign expressing the thanks of the town for the—presumed—care taken by drivers of motor vehicles. After dusk, however, it must, for some obscure reason, become quite safe to speed through these towns. At any rate, the sign is swallowed up in the darkness—along with the thanks. Dangerous crossings that call for the protection of numerous signs—and an A.A. Scout—in the daytime are assumed to lose their dangerous character in the dark, so the signs are allowed to become invisible—and the A.A. Scout goes home. We are an inconsistent race!—*Municipal Engineering*.

POPULAR & TRADE SECTION

COMPRISING

Installation Topics—Hygiene and Safety—
Data for Contractors—Hints to Consumers

(The matter in this section does not form part of the official Transactions of the Illuminating Engineering Society; and is based on outside contributions.)

Standardization of Lamps and Lighting Equipment

ENGINEERS are already familiar with the advantages of the standardization equipment of engineering accessories, but there are one or two special features regarding standardization of lamps and lighting equipment that require further emphasis. As is usual, standardization of any product is a slow process, but steady progress is being made in this direction, and it will be to the benefit of the whole of the electrical industry. The advantages of standardization of equipment in general are as follows:—

1. The retailer or wholesaler can carry smaller stocks.
2. There is a higher turnover because of the increased demand for a uniform product.
3. Prompt deliveries can be effected by all manufacturers.
4. The stock is more flexible.
5. Reduced cost of manufacture.

The result of standardization to the consumer may be briefly stated as giving lower costs and increased facility for obtaining supplies.

Standardization in the case of lamps is obviously of paramount importance, as the more that is done to limit the number of types of lamps the less become the production costs, while the consumer is able to obtain standardized bulbs and caps. The electric lamp manufacturers have done a great deal in the standardization of electric lamps. In conjunction with the British Engineering Standards Association, they have been able to define positions for the filaments, and have stated maximum dimensions for bulb sizes. Furthermore, there are specifications issued by the B.E.S.A., giving standard dimensions for the Bayonet Cap and the Goliath Edison Screw Cap, while the question of the standard E.S. Edison Screw Cap is receiving further attention. The standardization of caps is of equal value to the lamp manufacturer and the manufacturer of lamp holders.

Quite recently there has been issued B.E.S.A. Specification No. 161, dealing with the efficiencies, dimensions and the life of normal types of tungsten-filament lamps. Thus it provides a guarantee to the consumer that he is obtaining lamps of a specific quality. Not only are the lamps designed to have an average useful life of 1,000 hours, but owing to modern methods in manufacture lamp makers are able to specify the average amount of light that is emitted by a number of lamps. It has already been pointed out that there is a length of life for a given lamp which is of the most economic value to the consumer, and it will, therefore, be apparent that standardization is of the utmost importance. All E.L.M.A. standard lamps are supplied to conform to B.E.S.A. specification.

B.A.S. Lamps.—In recent years the manufacturers of car-lighting sets have co-operated with the electric lamp manufacturers to produce standard types of lamps for motor-cars. As a result of their deliberations the new B.A.S. Standards, 10 in number, meet almost

every requirement, 6 volt and 10 volt in this country. Previously there had been no less than 80 to 90 different types of motor-car lamps, and the possibility of the small retailer stocking each variety was out of the question.

Traction Lamps.—There is recently incorporated in the B.E.S.A. specification 161 schedules for the following:—

- Normal vacuum train-lighting lamps.
- Normal gasfilled train-lighting lamps.
- Traction vacuum-type lamps (series burning).

In each case details of dimensions, initial rating and life performance are given.

Lighting Intensities.—In the past there has been considerable difficulty in getting definite information regarding the proper intensity of illumination which should be adopted, and the experience of all the associated companies of the Electric Lamp Manufacturers have combined in producing a booklet which should help materially to establish standards of illumination. In order to bring about a better and more intelligent use of light it is essential that all sections of the industry work on a common basis.

Standardization of Fittings.—At the present time a number of committees exist for the purpose of considering the standardization of lighting equipment, and it is hoped that the result of their deliberations will be the production of specifications to ensure the interchangeability of component parts. Neck diameters and galleries must be standardized in order to give maximum service to the public.

For industrial purposes standard specifications for dispersive reflectors are being considered, and there are committees dealing with the quality of glassware, which should enable a higher standard of manufacture to be made possible.

As an instance of the need for standardization of fittings may be cited the sudden and immediate requirements of ships which often require large numbers of fittings for replacements at one or two days' notice. The non-standardization of bulbs and fittings in the past has very considerably hampered the despatch of these urgent supplies.

In conclusion, it is suggested that wherever possible standard manufactures only be offered, and in standard packages. In the past we have all been led away by some special enquiry of freak design, merely on statement that large quantities will be required. As a result the various manufacturers' warehouses have had quantities of non-standard goods on hand, which soon became slow moving or obsolete, ultimately having to be broken up and their value written off, thereby adding to the average cost of production.

Standardization benefits everybody, especially the user.

Supply Voltages.—Still further, there is an attempt to reduce the number of voltages of supply undertakings, for it is obvious that if one voltage were universal lamps could be produced in much larger quantities and they

could be manufactured more cheaply. Attached will be found a table giving voltage and the percentage of the total lamps supplied at this voltage. Contrary to experience, in America, where the low-voltage lamp predominates, there is in this country a large proportion of high-voltage lamps and the low-voltage lamps are in the minority. This may be attributed chiefly to the large number of D.C. supplies and the extended use of multi-wire systems, both A.C. and D.C.

A great effort is being made to link up adjacent supply companies, so that it is possible that one, or at the most two, standard supply pressures, probably between 220-240 volts, will become general. At the present time the lamp manufacturer is called upon to make many types of lamps, which can be classified as follows:—

- | | |
|---------------------|---------------------|
| (1) Standard type. | (6) Opaque Bulbs. |
| (2) Traction type. | (7) Daylight bulbs. |
| (3) Projector type. | (8) Gasfilled. |
| (4) Tungsten arc. | (9) Sign lighting. |
| (5) Automobile. | |

It is estimated that there are at least 2,000 different kinds of lamps in use in this country, when you take into account the various voltages and wattage, indicating the need for co-operation in this matter of standardization.

An analysis made of some 535 supply authorities which either supply to their consumers at one voltage only or at two voltages on the 3-wire system, and the results are as follows:—

Voltage	Number of Suppliers.	Percentage of Total.	Number of Consumers.	Percentage of Total.
260 ...	1 ...	0.20 ...	420 ...	0.040
250 ...	30 ...	5.60 ...	91,675 ...	8.800
240 ...	81 ...	15.00 ...	123,400 ...	11.900
230 ...	169 ...	31.60* ...	301,680 ...	29.000*
225 ...	6 ...	1.10 ...	1,237 ...	0.100
220 ...	90 ...	16.80 ...	151,865 ...	15.270
215 ...	1 ...	0.20 ...	700 ...	0.070
210 ...	23 ...	4.30 ...	36,867 ...	3.553
200 ...	59 ...	11.00 ...	177,361 ...	17.000
150 ...	1 ...	0.20 ...	2,400 ...	0.250
130 ...	2 ...	0.37 ...	370 ...	0.035
125 ...	1 ...	0.20 ...	475 ...	0.050
120 ...	2 ...	0.37 ...	787 ...	0.075
115 ...	2 ...	0.37 ...	5,650 ...	0.550
110 ...	17 ...	3.20 ...	18,438 ...	1.809
105 ...	7 ...	1.30 ...	22,241 ...	2.150
102 ...	1 ...	0.20 ...	3,066 ...	0.300
100 ...	42 ...	7.80 ...	93,565 ...	9.000

* Special attention is drawn to the high percentage at 230 volts

Sales of metal-filament lamps, vacuum and gasfilled, for year 1922:—

Voltage.	Proportion of Total.
100-120 ...	24.0%
125-190 ...	1.3%
200-260 ...	74.7%

Artificial Sunlight Treatment for Miners

We are interested to observe that artificial sunlight apparatus is being installed at the Sherwood Colliery for the treatment of pit boys. The clinic will be furnished with the most modern appliances, and will be under the control of a representative committee. The scheme is stated to be under the supervision of the New Health Society, the National Institute of Industrial Psychology, and the Sunlight League. One would naturally imagine that employees in mines, who spend so much of their time underground and are deprived of sunlight to a great extent, would benefit by artificial sunlight treatment, especially during the winter months. It will be interesting to hear the results of this experiment, which will be commenced in October.

Proper Methods of Desk Lighting

In our last issue (page 267) we referred to the importance of proper desk lighting. The two accompanying illustrations, for which we are indebted to Messrs. Korting & Mathiesen Electrical Ltd., show a striking contrast.

One of the chief defects in ordinary desk lighting is the creation of a bright spot and uneven illumination over the desk (Fig. 1).

By adopting a well-designed reflector and a frosted bulb there is no difficulty in getting even illumination (Fig. 2) free from the streaky effect which is so distracting to the eyes.

We much regret that by an oversight these two illustrations were inadvertently interchanged in our last issue. We now present them in their correct positions. The correct form of unit shown in Fig. 2 forms one of a series of special local units, of which Messrs. Korting & Mathiesen Ltd. make a special feature.

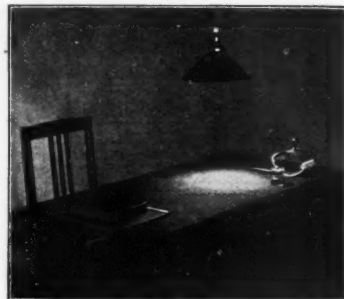


FIG. 1.—Spot of Light under Lamp.

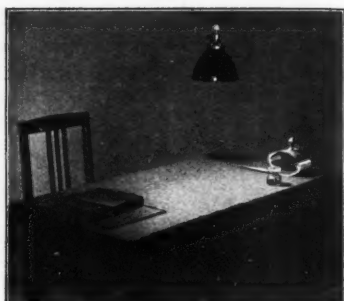


FIG. 2.—Table uniformly illuminated.

BOOKS by Leon Gaster and J. S. Dow

MODERN ILLUMINANTS AND ILLUMINATING ENGINEERING Second Edition.

This book deals impartially with modern systems of lighting—gas, oil, electricity, and acetylene—and discusses their practical applications. A feature is the variety of illustrations, many of them reproduced from photographs taken entirely by artificial light. The new edition has been brought into conformity with the most modern practice, and forms a complete work of reference.

CONTENTS: History and Development of Methods of Illumination—Gas Lighting—Electric Lighting—Oil, Petrol—Air Gas, and Acetylene Lighting—Illumination and the Eye—Colour and the Eye—Measurement of Light and Illumination—Globes, Shades and Reflectors, and Calculations of Illumination—Problems in Interior Illumination—Outdoor Lighting—Searchlights and other Appliances for the Projection of Light—Index.

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Explains in non-technical language the essentials of good lighting for industrial uses. 19 illustrations. 6d. net.

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A practical guide for householder or electrician, explaining the most suitable methods of employing electric light for domestic use. 6d. net.

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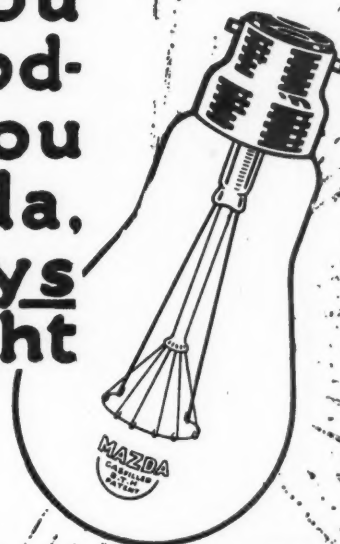
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MAZDA

ELECTRIC LAMPS

You take a new razor blade or a new cook for better or worse. You can't be sure which until you try. Thank goodness, when you put in a Mazda, you're always sure of good light

2479^A

Can be bought wherever electric lamps are sold.

Holophane Developments Abroad

IN a recent issue we referred to the Conference of Holophane Overseas Agents on June 7th, when papers summarizing lighting developments, both at home and abroad, were read. This conference has been followed up by a special "souvenir" issue of *Holophane Illumination*, which reviews progress in illumination all over the world and contains many striking pictures of Holophane installations.



FIG. 1.—Industrial Lighting at the Works of Forenade Trikabriker of Boras (Sweden).

An introduction, specially written by Mr. L. Gaster, traces the growth of the international movement in illuminating engineering and refers to the part played by Holophane Ltd. in early developments. Special reference is made to progress in standardization, which is receiving the attention of manufacturers of lamps and lighting appliances throughout the world. This introduction is followed by a summary, by Mr. D. H. Tuck,



FIG. 2.—A Section of the Works of the Ford Steel Plant Co., Fordson, Mich., U.S.A.

of progress in the United States. After that there are sections reviewing Holophane lighting installations in the Argentine and Chile, in France, Belgium, Italy, Holland, Norway, Sweden, Denmark, Finland, Australia, New Zealand, South Africa and India—in most cases prepared by agents on the spot.

From the considerable number of attractive illustrations we reproduce, by the courtesy of Holophane Ltd., four are of special interest. The first of these (Fig. 1) is an excellent photograph showing the lighting of the works of Forenade Trikabriker of Boras. This factory is lighted by 100-watt lamps in overhead reflectors, and is a good example of "localized-general" lighting.

In Fig. 2 we have a view of a section of the Ford Steel Plant Co., in Michigan, where Holophane industrial units are extensively applied, and in Figs. 3 and 4 we have two interesting views of installations on the new underground railways in Sydney (Australia). Fig. 3, showing the concourse at St. James's Station, is noteworthy for the specially designed pendant units; Fig. 4



FIG. 3.—The Concourse at St. James's new Underground Station, Sydney.

shows typical platform lighting, which appears not unlike that used in some of the underground stations in London.

The whole issue forms a useful record of developments throughout the world, and there are many attractive



FIG. 4.—Museum Station on the new Underground Railway, Sydney.

installations. Yet another interesting picture is that showing a tennis court at Melbourne which is artificially illuminated by Holophane units on either side of the court.

Several striking illustrations appearing in the section devoted to Holland include an installation in the Cathedral at Utrecht and the lighting of the Dutch Government Post Office Telephone Exchange at Rotterdam. Finally there are several typical British installations illustrated, representative of schools, factories, assembly halls, etc. Special mention may be made of the Roedean Ladies' School at Brighton and the new theatre at Bournville for Messrs. Cadbury.



FIG. 1.—A beautiful view of Whitehall by night.

Some Excellent Street-Lighting Installations

INCREASED attention is now being paid to the subject of street lighting. The post-war period of economy in artificial illumination has undoubtedly proved expensive in injuries received and lives lost through street accidents. To-day it is becoming more generally recognized by the local authorities concerned that a better illumination, not only of our main thoroughfares but of roads of secondary importance, is essential. The accompanying illustrations should therefore be of interest. They show that, with modern gas lamps, present-day requirements can be met easily and effectively.

Fig. 1 is reproduced from a photograph taken recently in Whitehall—London's most important thoroughfare. The photograph is doubly interesting because of its central feature. The Cenotaph is illuminated in a dignified manner at night-time solely by the light from the high-pressure gas lamps provided for the general lighting of the thoroughfare.



FIG. 2.—A private thoroughfare in the Peabody Estate at Hammersmith, showing gas used for street and staircase lighting.

The lamps used in Whitehall are supplied with gas compressed to 100–120 inches water gauge. Each has two mantles, and is scheduled to give a minimum light of 1,800 candle-power, but actually gives an average of about 2,000 candle-power. Most of the lamps are fixed on the pavement, but there are also additional units fixed on refuges in the centre of the thoroughfare.

The high-pressure gas main which supplies gas to these lamps also supplies gas for the lighting of the following important thoroughfares: Victoria Street, Shaftesbury Avenue, St. James' Street, Pall Mall, Piccadilly, Regent Street, Charing Cross Road and Cambridge Circus, Trafalgar Square and Northumberland Avenue, Queen Victoria Street, Lower Thames Street, New Bridge Street, Lombard Street, Cannon Street, Fleet Street, and Mansion House Street.

The main compressor station is situated on the premises of the Gas Light and Coke Company at Horseferry Road, where the plant consists of four gas-engine driven compressors. To maintain the desired pressure throughout the length of the main, however, an additional compressor station has been provided in Tudor Street, E.C., where there are three gas engines and two compressors. The high-pressure gas main is used for supplying gas not only for the lighting of the streets but for private lighting installations and for industrial purposes, the most important industrial consumers being the large printing houses in the City.

One of the compressors at Horseferry Road and two at the Tudor Street compressor station are in action throughout the day, and during times of low demand they meet all requirements. When the demand increases, owing to the lighting up of the street lamps, an additional compressor is put in action at Horseferry Road.

It is of interest to note that Whitehall has now been lighted by the present system of high-pressure gas lighting for about 17 years, and that the lighting of most of the other streets mentioned above has also depended on high-pressure gas for an equally long time. Throughout the whole of this period there has never been a single failure in the general supply of gas to these lamps. This is a very strong point in favour of gas, in view of the importance of the thoroughfares and the congested state of the traffic in them.

Figs. 3, 4 and 5 show night views taken in Prince Consort Road, South Kensington, S.W.7. These show examples of gas lighting by circular low-pressure super-



FIG. 3.—A Night View of Prince Consort Road, South Kensington.



FIG. 4.—Low-pressure Gas Lighting at its best in South Kensington.

heater gas lamps, each fitted with a cluster of four medium-sized mantles. Each lamp consumes 8 cubic feet of gas per hour and gives a light of 240 candle-power. The road is about 1,120 feet long and 50 feet wide, kerb to kerb—73 feet wide, building line to building line. In all there are 37 lamps, which are placed about 12 inches inside the kerb, and are "staggered." The average distance between the lamp on one side of the road and the next one to it on the other side of the road is 61 feet. The mantles are 11 ft. 6 in. above pavement level.

The following are particulars of average photometric readings taken on road level in this thoroughfare:—

	Foot-candles.
On footway, centre of path by lamp ...	1.07
Centre of road, opposite lamp ...	0.14
On kerb, midway between two lamps on the same side of the road ...	0.11
Six feet from kerb, centrally between two lamps on the same side of the road ...	0.10
Centre of roadway between lamps ...	0.11

All of the lamps are lighted up by hand each evening by one man in 15 minutes. They are left alight for 3,940 hours per annum.

The road is a straight one, and the disposition of the lamps at regular intervals presented no difficulties. The buildings in the road are either private houses or public institutions which provide no additional artificial light in the road. The excellent illumination achieved, therefore, is due solely to the gas lamps.

Figs. 2 and 6 show views taken at night-time in the avenues of the estate of the Peabody Donation Fund at Hammersmith. These private thoroughfares are lighted by circular lanterns with super-heaters and clusters of three bijou mantles. Each lamp consumes 6 cubic feet of gas per hour and gives a light of 180 candle-power. The lamps are lighted and extinguished by clockwork controls—the "London" controllers of the Gas Meter Company, Kingsland Road.

The staircase lighting of the tenement flats is also by gas. On each floor is fixed a Sugg's No. 1548 indoor back lamp with a No. 1 mantle, consuming 2 cubic feet of gas per hour. The lights are turned on and off automatically by "London" clockwork controllers working in conjunction with Sugg's distance-lighting devices. Each staircase has two clockwork controllers, the first turning on and off the lights on the ground and second floors, the second controlling the lights on the first and third floors. All lights are turned on simultaneously each evening at lighting-up time. Half of them, however, are automatically turned out at midnight, and the others at sunrise. This is the reason for the provision of two clockwork controllers for each staircase. Thus, up to midnight, a really good light is provided along the whole length of the stairway, while between midnight and sunrise sufficient illumination is provided to enable those coming home very late to find their way up the stairs without difficulty or risk of accident. It may be mentioned incidentally that gas is used for lighting throughout all of the 284 flats and 26 six-roomed cottages comprising this estate, as well as for the lighting of the communal wash-houses, drying rooms and baths.



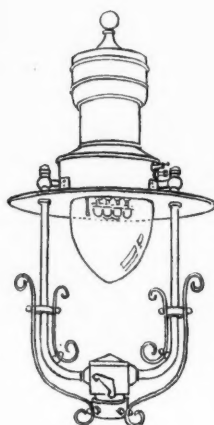
FIG. 5.—Note the almost complete absence of shadows which can be ensured by gas lighting.



FIG. 6.—Another view of a Gas-lighted Street on the new Peabody Estate at Hammersmith.

GAS

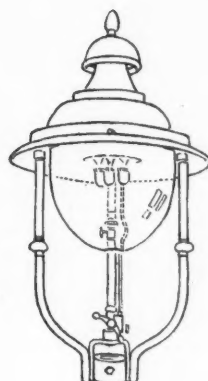
holds the
field for
**STREET
LIGHTING**



Sugg's

Upright 'Littleton'

—the lamp of distinction for principal thoroughfares, parades, public squares, etc.



Sugg's

'Promenade' Lamp

—far better appearance than the square lamp at little extra cost; widely adopted for new estates.



Sugg's

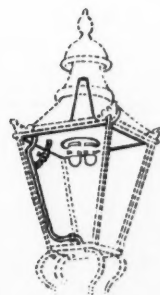
'Windsor' Lamp

—the '7290' type with superheated cluster of small mantles; made rightly and made well.

so long as proper
use is made of it
by employing only
scientifically
constructed
fittings



**WHEN YOU WANT
THE BEST**



Sugg's

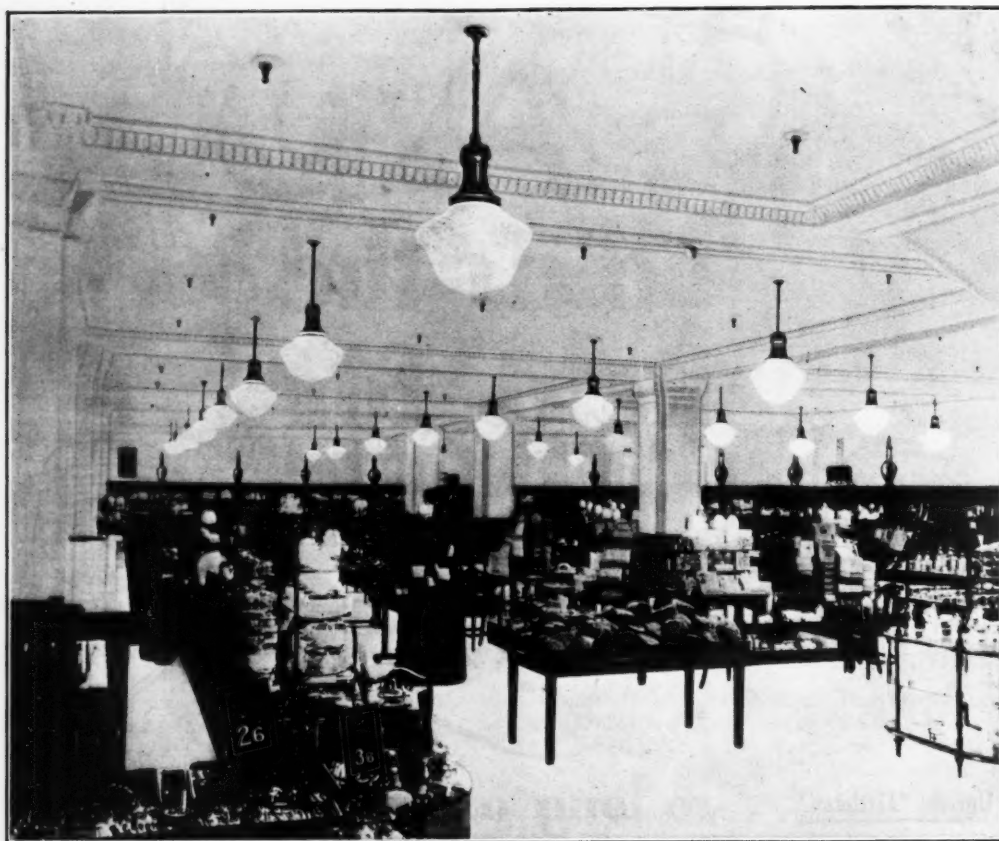
Conversion Sets

for modernizing existing lamps; the 'A' pattern shown here does the job completely. Less ambitious sets also available.

WILLIAM SUGG & Co., Ltd., Ranelagh Works, CHAPTER STREET, WESTMINSTER, S.W.1.

Developments in Retail Store Lighting

The New Barker Building



The Drug Department of Messrs. Barker's, showing G.E.C. fittings with Osram gasfilled lamps.

IT has often been remarked that great advances have been made in the lighting of leading London stores during recent years. The new Barker building is a typical instance. Messrs. John Barker's store has a frontage of 158 feet on High Street, Kensington, and a return frontage on Old Court Place of 240 feet, with a total floor space of 165,000 square feet. It houses one of the largest retail stores lighting installations in this country. This installation has many interesting features. The concealed window-lighting is so designed as to render the introduction of colour a simple matter. Carefully concealed foot-lighting is also provided, and there is a comprehensive scheme of "spot-lighting" as well.

Nearly a thousand specially designed G.E.C. units are employed for interior lighting, and the whole of the frontage is flood-lighted so that the whole building stands out in a very striking manner by night. Of special interest is the method of lighting the two arcade island windows, where cornice lighting with specially designed reflectors utilizing 20-watt Osram lamps is installed. Foot-lighting, recessed behind glass diffusers which permit the use of colour media, is also here employed.

The interior lighting of the eight floors is effected by totally enclosed G.E.C. diffusing units, and the above illustration, showing the drug department, gives a good idea of the effect—300-watt gasfilled lamps are used in diffusing bowls 17 inches in diameter, the whole being so designed that, in the event of an electrical defect, or if the lamp requires replacement, the holder and lamp are easily accessible without removing the fittings or glassware.

In the whole installation, which was carried out by Messrs. John Barker Ltd., over 8,500 Osram lamps are used. The electrical contractors were Messrs. Rierison Ltd., and the architect was Mr. H. L. Carbuche, F.R.I.B.A.

Sheffield Illumination Society

In connection with the Sheffield Illumination Society a cricket match—Lamplighters *v.* Shopmen—was played on the Townend United Cricket Club Ground, Stannington (by kind permission of the Townend Club), on the 3rd September.

Horace Twigg beat J. Wilkinson in naming the coin, and the Lamplighters batted first. They made a total of 44, A. Owen batting well for 25 runs, when, unfortunately, he had to retire hurt. For the Shopmen, M. G. Lockwood bowled well, and had the distinction of taking four wickets and making three catches.

The Shopmen made a sorry start, and were six wickets down for five runs. However, Percy Twigg and R. Parker made a stand, and eventually the Shopmen were all out for a total of 27, Percy Twigg being 10 not out. Horace Twigg and H. Wright played a good game for the Lamplighters and took four wickets each.

The umpires were Messrs. W. C. Cressy and R. Allen, and Messrs. J. Whitehead and C. Staley were the scorers. After the match the party had tea at the Sportsman Inn, Stannington, and later the evening was spent in the sports field. A novel feature was a ladies' cricket match, and this provided excellent sport. Ideal weather prevailed, and a most enjoyable time was spent.

Some Notes on the Exhibition of Street Lamps and Lighting Accessories

Arranged in conjunction with the Annual Conference of the Institution of Public Lighting Engineers in Brighton (September 12th-15th)

THE Exhibition of Lamps and Appliances for Public Lighting, arranged in the Corn Exchange, Brighton, during the holding of the annual conference of the Institution of Public Lighting Engineers, was a comprehensive one. A list of the exhibitors (twenty-four in number) was given in our last issue.* Both gas and electric lighting were represented. A feature was the display of various special luminous warning and direction signs, in addition to a wide range of lanterns, etc.—indicating that a new field exists for the efforts of lighting experts in the use of light to aid the control of traffic.

It is naturally impossible to describe this variety of exhibits in detail, but it is proposed to give a general idea of the salient features of the exhibition, and to mention some of the most interesting lamps and lighting devices.

THE GENERAL ELECTRIC CO.
LTD.

The "Wembley" Lantern.—

It will be convenient to start at the platform end of the hall, where the exhibition was opened on Monday evening. Here the stall of the General Electric Co. Ltd. occupied a prominent position. There was a good range of lanterns on view, special prominence being assigned to the "Wembley" lantern, with its special refracting and ventilating devices. A feature of the lantern is its weather-proof construction, and it is made in two sizes designed to accommodate respectively lamps of 300 to 500 watts and 1,000 to 1,500 watts. The prismatic glass refractor gives a curve well designed for street lighting, with a maximum of about 70° , and the lantern includes a focussing device—an essential element in lanterns of this type. The lantern may be used with a clear globe. But, in general, the best effect is secured when a lightly translucent outer globe is used. The variety of glass used is not sufficiently dense to interfere materially with the polar curve of light distribution furnished by the refractor, but it serves to soften the light considerably, and this is a consideration when high candle-power lamps are used.

A good idea of the effect of the lantern will be obtained from the two adjacent illustrations, a day and night view of the Worthing Promenade. The night view is selected as a very good example of the difficult art of night photography. We understand that the photograph was taken entirely by the light furnished by the street-lighting units, and the difficulty in getting good photographic results in street installations is well known. We were informed that the "Wembley" lantern has been specified for use with the new ornamental standards for Brighton, to which refer-

ence was made by Mr. Christie when replying to the discussion of his paper read on Wednesday morning.



FIG. 1.—The Promenade, Worthing, by day.

Pilot Wire Control of Street Lamps with Relay Switches.—Another novel and interesting device shown at this stall was the system of pilot wire control of street



FIG. 2.—The Promenade, Worthing, by night.

lamps with relay switches. Time switches for the control of public lighting have many advantages, but the very fact that they are "automatic" implies some drawbacks. During the period for which they are wound they are necessarily set to suit the longest night; hence the actual burning hours may be in excess of the useful lighting hours. Furthermore, automatic control naturally cannot take into account abnormal weather conditions. The pilot wire system enables lamps to be lighted or extinguished at any moment from a central point. They can, for instance, be at once lighted in the event of a fog.

* *The Illuminating Engineer*, September, 1927, p. 256.

In the demonstration of this appliance other advantages were pointed out. The relay coils are energized when the lamps are out, and the existence of a fault on the system is then at once signalized by the lighting up of a coloured lamp in the control room. If desired this warning can be duplicated in the Chief Constable's office, so that the police are also informed.

THE BRITISH THOMSON-HOUSTON CO. LTD.

The next stall visited was that of the British Thomson-Houston Co. Ltd., where there was again a variety, too great to enumerate, of lanterns and street-lighting



FIG. 3.—B.T.-H. Two-light "Swansea" Pole Top Bracket.

accessories. In the front of the stall there were two stands on which internally frosted bulbs were mounted and illuminated from below, so as to illustrate their diffusing qualities, which have rendered good service in street lighting. (It may, in fact, be said that the exhibit of naked filaments is now quite unnecessary, and will, it is to be hoped, soon become obsolete in street lighting.)

The two designs illustrated in Figs. 3 and 4 were selected as typical of B.T.-H. products. The design is constructionally sound, and there can be no question



FIG. 4.—B.T.-H. Three-Light "Sheffield" Pole Top Bracket.

of the pleasing effect of these ornamental lanterns equipped with diffusing glass. The exact variety of diffusing glass may be varied. For units mounted at a relatively low level complete diffusion of light, so that the lantern appears uniformly illuminated, is desirable. The familiar clusters of such units in Baker Street were, we believe, one of the first examples of this method in London. In the case of lanterns on relatively high posts such complete diffusion may not be necessary,

especially as it is sometimes desirable to combine the outer lantern with an inner refractor furnishing a polar curve suitable for getting fairly uniform illumination on the roadway. The writer was particularly struck by the "Nelite" diffusing glass, which has an ingenious crinkled outer surface resembling the pattern traced by rain in flowing down a window. This globe is claimed to be practically self-cleaning in a shower of rain, and the glass gives a mild sparkle which is distinctly pleasing. The "Nelite" glass is utilized with the "Rugby" type illustrated in Fig. 5, and again in the "Leeds" lantern shown in Fig. 6. Many other varieties of weather-proof lanterns, adapted for the lighting of streets or large outside areas, are illustrated in the latest B.T.-H. catalogue (L.412). Amongst these may be mentioned the widely used "Kent" lantern, the



FIG. 6.—The B.T.-H. "Leeds" Lantern

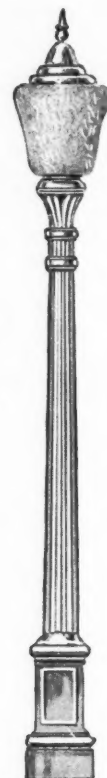


FIG. 5.—B.T.-H. "Rugby" Pole Top Unit mounted on Street Lighting Pillar.

"Effracta," with a Holophane refracting ring or lantern and focussing device, and numerous pole-top units of simple design.

HOLOPHANE LTD.

Holophane Ltd. had a representative series of prismatic street refractors, illustrating the latest developments in directional street lighting. As is well known, Holophane Ltd. have established a name for themselves by their ingenious use of prismatic glass for the control and direction of light, and apart from their own exhibit Holophane appliances were embodied in the units displayed by several other firms.

Fig. 7 shows a particularly pleasing form of ornamental lighting. The feature of the Holophane street refractors is that they are made of two pieces of crystal-pressed glass, one fitting within the other, so that both inside and outside surfaces are quite smooth and easily cleaned.

The familiar effect of such lanterns is that the desired control of the direction of light, with a view to obtaining uniform illumination on the roadway, is secured, but the light is diffused over the surface of the lantern—a condition that is essential to diminution of glare and decorative effect. During recent years the development of this idea has given rise to quite a variety of special designs. There are, for instance, the following types:—

Two-way Non-Axial for "between street" intersections and installed on the pavement edge; *Two-way*



FIG. 7.—An Ornamental Form of Holophane Lantern.

Axial for "between street" intersections but centrally installed; *Three-Way*, for "T" street intersections; *Four-Way*, for four-way street intersections; *Symmetrical*, for large open spaces.

In these cases the natural distribution of light from the lamp used is modified as desired. The lateral beams of light emit candle-powers many times that of the bare light source, and by selection of a suitable type it is possible to ensure that the greater part of the light is applied where it is mainly needed, on the road surface, at the same time avoiding the unsightly effect of undue concentration of light downwards.

Other forms of special ornamental units are also available, and the contents of the stall gave a good idea of the diversity of Holophane street-lighting units. Further technical data will be found in a useful booklet published by the company and entitled "Scientific Street Lighting: A Guide to Good Practice." The selection of appropriate fittings requires considerable experience and judgment, but it is understood that engineering service and advice on street-lighting problems is furnished by the Street-Lighting Department of Holophane Ltd. without charge.

ENGINEERING AND LIGHTING EQUIPMENT LTD.

The display by this firm comprised a complete range of street-lighting fittings, including the "Glasgow," "Trent," "Dee," "Verulam," etc.—of special interest being the new range of "White-way" and "Paisley" fittings, which utilize diffusing glass and have a distinctly decorative appearance. In Fig. 8 we illustrate one of the very latest forms of diffusing lanterns, but this is only one of many types on view. We were interested to notice in a number of cases the incorporation of the "anti-break" anti-vibration discs, which consist of two concentric rings connected by strips of springy phosphor-bronze. This is stated to have proved useful in streets where an exceptional amount of vibration from traffic exists; it is understood that its first most important application was on battleships. A



FIG. 8.—One of the latest models of Engineering & Lighting Equipment Ltd. A pleasing design.

glance at the catalogue of this firm reveals evidence of activity in other directions, e.g., one notices an illustration of a striking example of concealed chancel-lighting in a cathedral.

Fittings for suburban street lighting were also illustrated, and there was on exhibition a new form of time-switch, very compactly designed, that deserves attention.

METRO-VICK SUPPLIES LTD.

Metro-Vick Supplies Ltd. had a good general display of fittings for exterior lighting. We are reproducing below two views of graceful standards equipped with diffusing lanterns at top, which is in line with the general tendency towards "White-way" lighting. It is interesting to recall that one of these, the "Brighton," was first used in the Pavilion Gardens in that town.

Another interesting novelty, which was on view both at the stall of Metro-Vick Supplies Ltd. and at the neighbouring Siemens stall, was the Benjamin

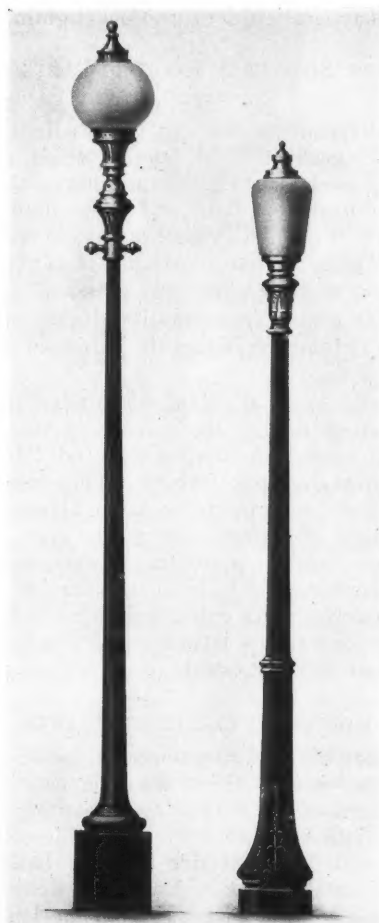


FIG. 9.—Two very graceful forms of Standards with diffusing lanterns shown at the stall of Metro-Vick Supplies Ltd. ("Brighton" and "Paisley" types).

R.L.M. "one-piece" metal reflector. Whilst having obvious possibilities for general outside lighting, this reflector was primarily designed for industrial use, and complies completely with the recently issued B.E.S.A. specification for industrial Reflector fittings, having an angle of cut-off of 20° . The distinctive feature of this reflector is that it is made from a single piece of metal. There is no overlapping or join whatever—a manifest advantage in promoting uniform enamelling and in avoiding possible leakage of moisture through interstices at the join. Leakage of this description is a well-known difficulty in the design of reflectors for external use, and in spite of the most careful workmanship is liable, sooner or later, to cause deterioration.

The familiar Benjamin "Rodalux" reflector, illustrated below, which is specially suitable for the lighting of long passages, etc., was also shown, both at the Metro-Vick and Siemens stalls. The former firm,

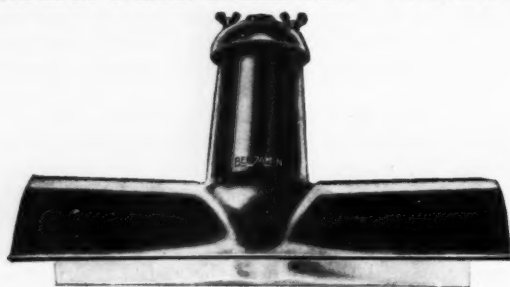


FIG. 10.—The "Rodalux" Reflector.

however, also showed a modification of this design, a round reflector of the standard form with grooves of the "Rodalux" type at angles of 120° ; this should have special applications for directional lighting.

MESSRS. SIEMENS & ELECTRIC LAMPS AND SUPPLIES LTD.

A special feature of this exhibit was the display of "Silvalux" gasfilled opal lamps, which are being increasingly used for street-lighting purposes, owing to the better diffusion of light and elimination of glare. These lamps, it may be recalled, are made up of special "two-ply" glass (an inner coating of clear glass and an outer coating of pure white opal glass).

There was also a representative display of fittings for exterior lighting, including the Benjamin specialties mentioned above.

Incidentally one's attention was drawn to a novel and interesting device, the convenient insertion, by means of a screw-in holder, of a "Zed" fuse at the apex of street lighting fittings. This fuse is sufficiently delicate to protect the lamp filament against sudden surges of current, and as the cost of a high candle-power lamp is a matter of some moment the protection afforded should be of considerable assistance to those concerned with public lighting. It was stated that the device was first introduced in Bradford, where it has proved very successful.

MESSRS. KORTING & MATHIESEN ELECTRICAL LTD.

The display of this firm was varied, including several quite distinct items. First may be mentioned two different forms of the "Dia" long-burning flame arc lamps, the introduction of which in this country not long ago created considerable interest. In Berlin and other Continental cities they have become widely used, and it seems possible that owing to the long-burning period (about 126 hours per trim) they may give the flame arc a new lease of life for outdoor lighting. As the lamp is stated to consume only about 0.2 to 0.3 watts per candle-power (mean hemispherical) the efficiency is rated considerably higher than that of incandescent lamps. The lamp is ingeniously designed with several alternative forms of upper reflector, one of which comes down so low as practically to cover the globe, screening it from the eyes of observers.

The exhibit also included a representative series of the "Throlite," "Farlite" and other lanterns, concentrating and dispersive reflectors for street lighting, safety couplings, winches, etc. Attention has recently been drawn to the possibilities of these special reflectors for public lighting. It is stated that owing to the prismatic inner lining a highly extensive polar curve, suitable for street lighting, can be obtained, whilst at

the same time the filament is exceptionally well screened by the concentrating type of reflector.

The most novel exhibit, however, was the "Safety-First" lantern, illustrated in Fig. 11. It will be recalled that the chief feature of this device is the combination of a "Throlite" reflector, projecting light downwards, with a surrounding red triangle (duplicated on three or four sides), which is illuminated by special tubular



FIG. 11.—The Korting & Mathiesen "Safety First" Lantern.

lamps. This can be operated on intermittent light. We have thus a combination of the luminous safety device with a unit directing a specially strong illumination downwards, which renders the device as a whole specially suitable for use at dangerous cross-roads and points of exceptionally crowded traffic.

MESSRS. BARBER & COLMAN LTD.

At this stage reference may be made to an interesting exhibit at a neighbouring stall, the Electric Flashing Beacon of Messrs. Barber & Colman Ltd., which, we understand, is being shown for the first time in this country. A pulsating amber light is shed in four directions, whilst at the base of the beacon is a 200-watt lamp in a powerful reflector which serves to illuminate the police officer on patrol duty. At the same stand a pedestal type of electric flashing beacon is exhibited by courtesy of the Ministry of Transport, who have ordered two of this type for erection in the London area.

We were also shown a highly ingenious three-colour traffic signalling device, controlled from a central switch-board, so that the lights can be set for any desired intervals to cause traffic at cross-roads to proceed or halt. This device is widely used in the United States. How far it can apply to streets in this country remains to be seen. But it has obvious possibilities that deserve careful study.

THE CABLE ACCESSORIES CO. LTD.

The stall of this firm contained a miscellaneous array of street-lighting devices. The "Edinburgh" fitting illustrated on next page struck one as a specially pleasing unit having the refractor below for the direction of light and a short canopy above containing panes of diffusing glass (which might doubtless be used for the names of streets, etc.). There were also steel reflectors of the

familiar industrial class and units in which traffic indications played a part—for instance, the three-light fittings having diffusing globes on left and right and a ruby warning globe in the centre for use on street refuges, etc.



FIG. 12.—The "Edinburgh" Fitting (The Cable Accessories Co. Ltd.).

THE ELECTRIC STREET-LIGHTING APPARATUS CO.

This firm is prominently associated with the design of special "directive" street-lighting fittings, and in Fig. 13 we reproduce a view of the "Bi-Multi" unit which, as will be seen, utilizes a series of inclined mirrors so as to accentuate the light at distances most remote from the lighting unit. In a leaflet describing this device it is stated that at a distance of 60 feet and onwards the original candle-power of the lamp may be multiplied approximately ten times. Naturally this multiplication is effected by concentration of light otherwise expended upwards or on the faces of buildings, etc. A distant observer sees in the reflectors a series of images of the filament. It is emphasized that, owing to the high candle-power in certain directions, units should be mounted as high as possible, and in no case at a level less than that demanded in the specification. In a leaflet issued at the exhibition the ease with which such units can be applied in order to meet the requirements of the B.E.S.A. specification is pointed out, and the "Unit" system developed by the company is specially suitable for the economical conversion of existing posts. Provision is also made for the special treatment of cross-roads, intersections at various angles, etc.



FIG. 13.—The "Bi-Multi" Street-Lighting Unit.

The second illustration shows quite a different type of unit, and illustrates the variety of types made by this firm. This is a simple lantern with diffusing glass panes, suitable for mounting at relatively low levels, and for use in cases where general diffusion of light is desirable and special "directive" effect is not desired.



FIG. 14.— A simple form of Diffusing Lantern.

MESSRS. FALK, STADELMANN & CO. LTD.

This stall was arranged to illustrate the distribution of this firm's interest in both gas and electric fittings. In the foreground was a simple but effective form of pedestal unit with diffusing glass globe. On either side were traffic "caution" lamps with ruby globes, one gas and one electric. On the left hand were a series of the well-known "Super-Ukay" inverted gas lamps, and it was interesting to observe how greatly the adjustment and gas and air regulation has been improved during recent years, the present mechanism showing considerable ingenuity and skill in design. One special feature of these lamps, which are fitted with the latest model of super-heater, is the fact that the regulator as a whole can be removed from the lamp by merely taking off a hexagon nut. On the right were various typical lanterns housing electric lamps, such as the "Dover" and the "Melton," which are widely used for street lighting. The latter form embodies sound construction, provision for adequate ventilation being a special feature, and is made in two sizes—one for lamps up to 500 watts, the other for lamps up to 1,500 watts. Both can be supplied with either clear or opal globes, as desired.

MESSRS. WM. SUGG & CO. LTD.

The exhibit of Messrs. William Sugg & Co. Ltd. was particularly interesting for the display of novel gas-illuminated traffic signs, though naturally there were also on show a variety of standard types of public and outdoor lamps. In Figs. 15 and 16 we reproduce views of two of the latest models, the "Upright Littleton" and the "Promenade" lamps. Special forms of distant control, with which Messrs. Wm. Sugg & Co. are so prominently associated, were also on view. We understand that this distant control is proving increasingly useful for the lighting up of "parade lamps," etc., as well as in large interiors having lamps mounted at a

considerable height and not readily accessible. It was specially interesting to observe the clever working of the "dual" controller by the aid of which several of a series of burners can be extinguished at a given hour, leaving only a single one alight after midnight. Whilst most public lighting authorities agree that street lighting must never be entirely extinguished during the hours of

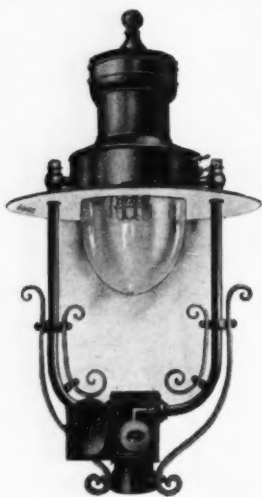


FIG. 15.—The Upright "Littleton" Lamp.



FIG. 16.—The "Promenade" Lamp.

darkness, there are opportunities for economies in the small hours, especially in areas that carry very little traffic. There was also a demonstration of the action of an automatic controller mounted on the "Scarborough" lamp, which illustrated a useful device that is perhaps not generally known. With this controller the lamp is automatically lighted up, extinguished, and lighted a second time. Thus in the unlikely contingency of the lamp lighting back at the first effort matters are put right at the second.

Turning next to the traffic devices, we have in Fig. 17 a view of the "Synalite" danger sign, which is a good instance of the application of illuminating engineering

In Fig. 17 we have yet another novel traffic device, the "Reflex" danger signal. This does not carry any lamp, but is actuated either by the light of an adjacent street lamp (the position of the signal being properly selected), or from the light of the sky above. At the top of the iron pedestal there is a small square box faced with red glass, and within it a mirror of special shape, designed to collect light from above. The red glow emitted from the box in these circumstances is quite sufficient to attract the attention of drivers, and this must be considered a distinctly ingenious and useful device.

The last illustration shows the very latest safety-first device. This was not completed quite in time for the exhibition, but by the courtesy of Messrs. Wm. Sugg & Co. Ltd. we are enabled to illustrate the design.



FIG. 17.—The "Synalite" Danger Sign.

It will be observed that the design carries the familiar red triangle, and below it the words "Slow," both illuminated by gas lamps within the box. If desired the design can be operated by a flashing light.

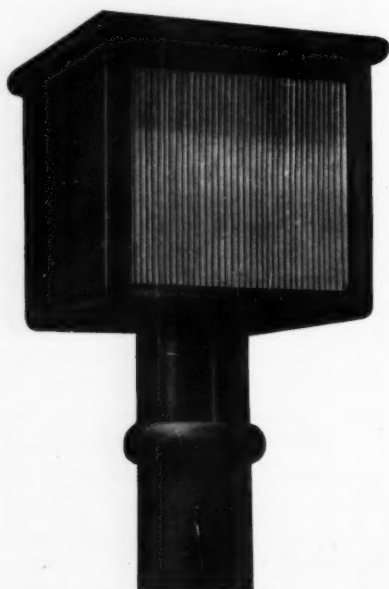


FIG. 18.—Sugg's "Tottenham" Reflex Danger Signal.

principles. The burner is above the sign proper, which is inscribed in red on the glass pane. Behind this is a white reflector, so shaped as to be approximately evenly illuminated by the lamp above. Thus, the indication "Danger—Cross Roads" stands out boldly against the illuminated background. This form of sign is also being made up in the form of a Maltese Cross, so that a caution sign is exhibited in each direction at cross-roads; in this case destinations of roads can also be included.



FIG. 19.—The latest form of "Safety First" Indicator lighted by gas.

These devices indicate the interest being taken by leading firms in luminous traffic-control devices, which offer a good field for the skill of lighting experts.

There was one other curious exhibit we must not overlook—a framed engraving showing the lighting of Brighton by 200 "Whitehall" lamps in 1890—a very interesting old print, which naturally attracted considerable notice from visitors to the exhibition.

THE LIGHTING TRADES SYNDICATE LTD.

The most interesting item at the stall of the Lighting Trades Syndicate was undoubtedly the new magnesia super-heated "Renown" burner. This represents a new departure in burner design. Hitherto pre-heating chambers have been constructed mainly of metal, which is liable to corrosion. Metal gauzes or perforated magnesia discs have hitherto been necessary in order to prevent back-firing, but they have the drawback of needing frequent cleaning and replacement owing to oxidation. Magnesia perforated discs are not liable to

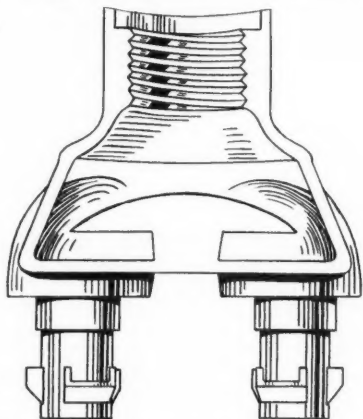


FIG. 20.—Showing features of the "Renown" Burner.

corrosion, but the velocity of the mixed gases is lowered—and to an even greater extent than is the case with metal gauzes.

In the "Renown" burner the necessity for gauze or perforated magnesia is removed by the curious and interesting internal design, shown in section in the accompanying illustration. Apparently the mushroom-shaped projection achieves this object. It will be observed that there is no obstacle to the free passage of the gases; yet, as demonstration showed, the burner refuses to "light back," and can be turned down smoothly and progressively without any explosion occurring.

This new arrangement should result in elimination of corrosion and reduced maintenance costs, a more stable and efficient light, and increased life of mantles owing to the quieter lighting up and extinction. Tests now in progress under practical conditions of street lighting have given very favourable results, the mantle average to date being less than 2.5 per annum.

A feature is the high efficiency secured. According to data supplied to us, tests on 500 B.Th.U.'s at 3 in. pressure gas gave a maximum duty of no less than 35 candles per cubic foot per hour with the two-light burner. A three-light burner gave a somewhat better result, i.e., 38 candles per cubic foot, and the four-light burner an efficiency of 39.5 candles per cubic foot at the best angle. The results of tests are illustrated in a leaflet issued by the Lighting Trades Syndicate by means of polar curves, which show that the maximum candle-power is approximately maintained over quite a wide angle. The efficiency recorded seems very good for a low-pressure burner of this type, and the new device marks an interesting departure in burner design.

MESSRS. A. E. PODMORE & CO.

As stated in a recent note in this Journal, the firm of A. E. Podmore & Co. have been associated with much pioneer work in the past, and it was interesting to observe that under the present management they are originating further new devices. The first of these, shown in Fig. 21, the "Ollerenshaw" traffic sign, works on a new principle. The design ingeniously dovetails the familiar triangle and an arrow. The sign gives a double-flashing effect, the centre "Safety First" triangle lighting up in brilliant red alternately with the two portions of the arrow on each side, which are in white. Alternate flashes take place every three seconds. This white-and-red design on a black background stands out well by day when the sign is not illuminated.

Although at present operated electrically, we understand that the idea could be equally well applied to gas and acetylene lighting, and no doubt signs operating by these methods will also be available in course of time.



FIG. 21.—The "Ollerenshaw" Traffic Sign, with double-flashing effect, the red triangle lighting up alternately with the white arrow.

The second item in this exhibit which attracted attention was the "White-way" light shown in Fig. 22. This embodies sound mechanical construction and a white glass globe of good design, which houses a 1,000-watt gasfilled lamp. It is stated that the candle-power in the maximum direction is approximately 3,000. Notwithstanding this high candle-power, the well-diffused even distribution of white light over a wide area is most effective in eliminating glare, the conditions resembling

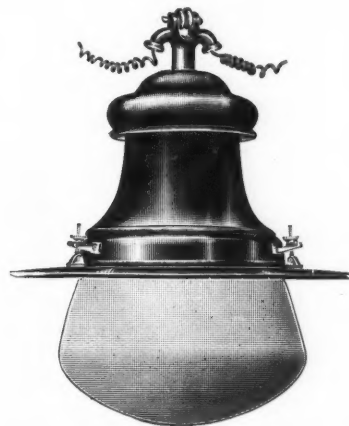


FIG. 22.—Podmore's "White-way" Light.

daylight in producing a soft effect and avoiding harsh shadows. Attention may also be drawn to the special "Regant" glass of which the globe is composed. This glass, although of the multiple type, gives the desired diffusion with the minimum of absorption. We understand that these dust-proof fittings can also be supplied with pink or blue glass, the latter being recommended for use in shops where correct appearance of colours is of consequence.

Although first made for electric lamps, it is also proposed to equip it with one-, three- or five-light gas burners, and it should then form a useful addition to the available supply of gas lamps for outdoor lighting.

With characteristic enterprise the firm is thus extending its operations to include both gas and electric fittings. We hope they will be successful in popularizing the "White-way" gas lamps for street lighting.

FOSTER & PULLEN LTD.

Messrs. Foster & Pullen Ltd. showed a representative display of gas lamps, which are available in a wide variety of forms both of the suspension and wall-bracket types. Lists also contain particulars of a good range of of wall pillars for street-lighting work. The firm also supply lamps with the Newbridge street-lighting controllers (shown also at an adjacent stall).

The illustration shows a typical "Avil" inverted lamp, fitted with brass super-heater burners with air and gas adjustment. In this lamp two burners and two extra cocks are fitted, so that part of the lights may be turned out if desired. The "Avil" series of inverted lamps manufactured by this firm are characterized by

extreme simplicity, combining the advantages of the inverted lamp with the square lantern. The upper casing is easily removed and the burner lifted out to receive attention, and it is stated that the lamp has been specially designed to meet the requirements of a prominent superintendent of public lighting.



FIG. 23.—"Avil" Lamp (No. 521). (Messrs. Foster & Pullen Ltd.)

In common with other firms, Messrs. Foster & Pullen Ltd. have been devoting attention to signal lanterns, and have evolved some very simple forms bearing standard warning devices. The body of the lantern is painted black, relieved by white borders round the panes, and the pillar is painted with alternate black and white bands. This, in conjunction with the opal and ruby leaded-glass panes, forms a distinctive device which at once catches the eye.

THE HORSTMANN GEAR CO. LTD.

The array of controllers at the stall of this firm could not be described without utilizing an amount of space far beyond that available. Some leading types have been previously described by Mr. Horstmann for the benefit of readers of this journal, and full particulars will be found in the fascinating little booklet "Automatic Lighting," issued from the Newbridge Works (which incidentally contains some interesting historical notes on the introduction of automatic control for street lamps). At the present time these controllers are being increasingly used by public lighting authorities. Time switches are now housed in a very neat and completely weather-proof manner, and can be detached for examination with the greatest ease. Visitors could only marvel at the advances that have been made in these devices during recent years and the great skill which their design shows. Time switches were shown for many different purposes, for unit and group street lighting, for use in shops and other buildings, etc. Some especially neat and simple swan-neck types for conversion schemes were on view. The type of "suspension" lamp controller here illustrated (15/3A) has been only recently introduced, and is claimed to be the shortest unit of this type on the market, being only 5½ inches long and guaranteed to pass 20 cubic feet per hour.

VENNERS TIME SWITCHES LTD.

Equally comprehensive was the selection from the well-known range of electric time switches of this firm. The switches vary in capacity from 1 amp. 250 v. to 400 amps. 600 v., and embody many variations in housing and automatic time control. There was also shown a clever but simple electrically-wound clock on an entirely new principle, and a very compact and silent electric flasher sold at a very moderate figure. The electrically-wound clock is the subject of a new list just being printed, and should have a marked effect on many branches of time switching.

THE LONDON ELECTRIC FIRMS LTD.

One of the chief features of the display of the London Electric Firm was their raising and lowering gear, suitable for all forms of public lamps, which, it is stated, is being used by about 100 Corporations and supply companies, as well as by many Government Departments and in important public buildings. The feature of the "One Working Part" gear is its simplicity and

robustness. It is based on a plunger with piston-ring contacts and a pin engaging with the ratchet to take up the weight of the rope. The device does not depend on the action of springs, lever, catches or clutch-gear. It has no perishable or combustible material in its construction, and is suitable for all the usual voltages. All the necessary accessories, winches, pulleys, galvanized steel wire rope, etc., are provided. The comprehensive list containing details of these parts contains numerous illustrations showing their application to typical forms of standards. There is also a long series of illustrations showing typical installations in the streets of leading cities, as well as in such well-known buildings as the Houses of Parliament, the Royal Albert Hall, Olympia, etc.

OTHER EXHIBITS.

We can only refer very briefly to a few of the other chief exhibits. Automatic control was again represented in the display of the Gas Meter Co. Ltd., whose "London" controller is also characterized by extreme simplicity and is widely used, and by the various clock controllers of Metropolitan Gas Meters Ltd. Typical gas lamps for public lighting were exhibited by Messrs. W. Parkinson & Co. and by Messrs. Alder & Mackay, who also showed their well-known controller based on the pressure-wave principle.

Another example of automatic control was afforded by the "Gunfire" device of the British, Foreign and Colonial Automatic Light Controlling Co. Ltd.

A general display of street lamps was shown by Messrs. Wm. Edgar & Son Ltd., a firm of old standing.



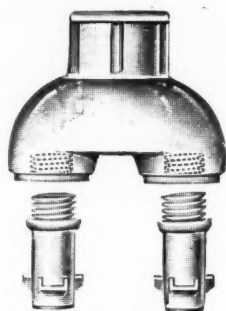
FIG. 24.—New type of Controller for Suspension and Harp Gas Lamps (No. 15/3A).

Municipal Supplies Ltd. did not restrict their exhibit to gas burners, but included a number of ingenious appliances, including the simple "Peebles" heat indicator, the centrifrif drilling machine, and a pocket torch operated by a small dynamo driven by the pressure of the thumb.

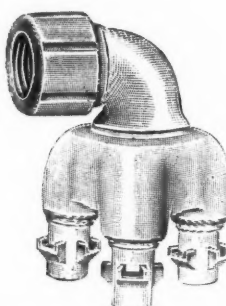
There was general agreement that a most representative series of exhibits of modern street-lighting appliances had been assembled. Summing up, one might say that the three chief outstanding points were (1) the great variety of street lanterns and refractors, (2) the development of methods of automatic control for public lamps, and (3) the progress shown in the development of luminous traffic-control devices.

E.L.M.A. Illumination Design Course

As we go to press we receive particulars of the E.L.M.A. Lighting Service Bureau's sixteenth Illumination Design Course, which opens on October 10th. A series of nine weekly lectures deals with such matters as planning lighting schemes, floodlighting, colour, domestic lighting, etc., the final lecture being devoted to a review of practice at home and abroad. These courses are in great demand, and as the accommodation is necessarily limited, applications to attend the course should be addressed to the E.L.M.A. Lighting Service Bureau, 15, Savoy Street, Strand, London, W.C., at the earliest possible moment.



"Renown" 2-light Magnesia Superheater with Detachable Nozzles.



"Renown" 3-light Magnesia Elbow Burner for use with Street Lighting Conversion Sets.

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The introduction of "Renown" Magnesia Superheater Burners will enable economies to be made in public gas-lighting systems and a higher standard of lighting efficiency to be obtained.

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"Renown" Burners can be supplied with either fixed or detachable nozzles.

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TRADE NOTES & ANNOUNCEMENTS

THE OPENING OF THE LIGHTING SEASON.

With the opening of the lighting season publicity literature from many quarters is reaching us, and the coming period should be a busy one. The effects of the E.D.A.-E.L.M.A. Electrical Ballot are now being felt, and many new consumers of electricity are expected. The "Cur Circle" E.D.A. campaign to promote the use of electricity has now been launched, and this is being followed by enterprising efforts on the part of leading firms in the lighting industry.

From the volume of data before us we can only select a few examples. The 1927-8 Mazda Advertising Campaign includes the dispatch, early in the season, of a million of the attractive 16-page booklet entitled "The Story of the Mazda Lamp." Another effort is the Mazda window display, which occupies little space but is striking, featuring the well-known "Mazda Girl" in a new pose. The wording is lighted from behind by a flashing lamp, whilst the words "Mazda Lamps" at the base are continuously illuminated. The display is provided with a thermal flasher, two lampholders and an adapter, ready wired to a length of flex. The two lamps are the only items the trader has to supply.

Other publicity ammunition includes a series of attractive showcards, one of which is reproduced. The Mazda girl appears once more, and the lively interest expressed on the faces of the two small children may be regarded as indicative of the public attitude.

Finally, there is the new Mazda catalogue of lamps, a well-executed and informative piece of work containing no less than 36 pages, and a variety of leaflets and folders dealing with lamp specialities.

From Philips Lamps Ltd. we also receive a selection of the new folders now being issued to the trade, and also particulars of the new window display entitled "The Lamp of the Universe." The design is striking, an Argenta lamp projecting through a dome-shaped sky studded with stars. (The Argenta lamp, with its opal bulb and soft light, is naturally an essential to the success of this device.) These displays are sent out ready wired, and an expert window dresser on the staff is placed at the disposal of any trader who needs assistance. The Philips Publicity Campaign will be devoted largely to popularising the Argenta lamp. Advertisements are being widely distributed in the press. A variety of leaflets, printed in attractive colours, deals with Philips "Daylight" lamps, colour-sprayed, sign, vacuum and other types. All are novel in design, and should be serviceable to traders, who can rely on every assistance from Philips Lamps Ltd.

The publicity programme of Messrs. Siemens and English Electric Lamps and Supplies Ltd. is on a similarly extensive scale. The coloured outside front page of an attractive seasonal leaflet bears a figure of a Scotchman admiring the "braw bricht licht" of Siemens lamps. The inside pages,



An Attractive "Mazda" Display.

executed in blue, illustrate various items in the publicity display for the current season. On the back the general programme of Siemens lamp publicity during the season 1927-8 is outlined. This includes posters, film advertising (a real life-story film featuring Siemens lamps, to be shown in leading cinemas during October and November), a special novelty booklet entitled "A History of Lighting," magazine, trade journal and railway advertising, and attractive window displays. Messrs. Siemens Electric Lamps and Supplies Ltd. likewise offer to send an expert to dress windows.

As another instance of seasonal activity we may also mention the formal opening, by the Chairman of the Company (Mr. J. R. Yates), of the new Depot premises of the Welsbach Light Co. Ltd. in Leeds. The opening was attended by a representative gathering, and we shall be giving fuller particulars of these new premises in our next number.

* PERSONAL.

We are asked to state that Mr. H. L. Smith, the Yorkshire representative of Benjamin Electric Ltd., will in future devote his activities to Benjamin business on the Continent, and that his past duties in Yorkshire, Durham and Northumberland will be taken over by Mr. F. W. G. Towers.

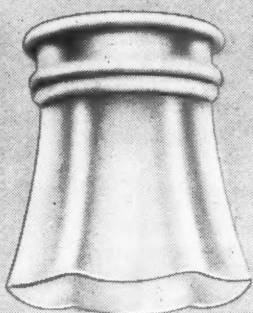
A GREAT ADVANCE IN STREET LIGHTING

THE "BI-MULTI" REFLECTOR

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*For Restful
Light*

USE
VITREOSIL
HEAT-PROOF
GAS GLOBES

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THEY OBVIATE GLARE

VITREOSIL (Pure fused quartz) is a remarkable diffuser of light. It converts the mantle's glare into a magnificent flood of soft restful radiance

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THE THERMAL SYNDICATE LTD.,

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**SOLE AGENTS IN AUSTRALIA: WARING,
MARTIN & HARRIS, 49 CLARENCE ST. SYDNEY**

Announcing the
Latest Newbridge Gas Controller
Type 15/3A.

The following features are worthy of careful note:—

1. The clockwork movement is identical with our well-known TYPE 3A/UNI, and may be removed and replaced by a guaranteed interchangeable spare without disturbing any gas connections.
2. It is the shortest "suspension" controller on the market, being only 5½ inches long over all.
3. It is guaranteed to pass 20 c. ft. per hour at 25/10ths inlet and 23/10ths outlet pressures.
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5. Each controller is fully guaranteed.
6. Prices are strictly moderate.
7. It is BRITISH MADE, save the Swiss fully jewelled, double roller lever escapement.

PLACE YOUR ORDER NOW FOR SAMPLE TO TEST.

*A further repeat order is to hand from The
South Metropolitan Gas Company for 4,267
Newbridge Gas Controllers, which includes
some of the above type.*



15-DAY RUN
QUICK LIGHTING AND
EXTINGUISHING.
FOR VERTICAL OR
DESCENDING SUPPLY.
CAST IRON OUTER CASE
STANDARD ALUMINIUM
TO ORDER.

Sole Manufacturers:

**THE HORSTMANN GEAR COMPANY, Ltd.
NEWBRIDGE WORKS - - BATH**

Newbridge Time Switches for Electric Street
Lamps and other purposes are just as good as
the Gas Controllers.

"SUPASTONE" GLASSWARE.

It is possible that all readers of this journal do not yet appreciate the remarkable development of decorative lighting fittings during the last few years, as illustrated in the showrooms of leading firms in the lighting industry. To many a tour of these showrooms would prove a revelation. A particularly fine selection is to be seen at the showrooms of the Wholesale Fittings Co. Ltd., in Commercial Street (London). One of the



specialities of this firm is the "Supastone," three-ply glassware which renders itself very well to decorative treatment. Many charming forms of diffusing shades and globes are to be seen, and a good impression of their appearance may be gathered from the illustrations in colour in the "Supastone" catalogue. On close examination the "three-ply" process can be clearly recognized. At the edge of the glassware three distinct layers may be seen. In the simple form we have a white glass of good diffusing quality and smooth exterior. But it is possible to give the outer layer any desired colouration.

Fittings of this material are now made in a remarkable variety of shapes. One of the most interesting things seen during a recent visit to these showrooms was a shop-window reflector of special form, to which this same principle has been applied. A special process renders the exterior opaque, but the inner surface of the reflectors, though formed with the wavy lines characteristic of metal reflectors, is of glass. The inner white surface is claimed to give improved diffusion and enables streakiness and striations to be eliminated. A demonstration was arranged to show that this form of "Supastone" shop-window reflector is also more efficient than the conventional metal type.

Another highly ingenious line of fittings is the "Silchrome" decorative shades, which, though composed of diffusing glass, have the appearance of silk. In many restaurants the proprietors are unwilling to discard the "cosy" effect of illuminated silk—notwithstanding the difficulty of keeping them clean. It is claimed that the "Silchrome" shades, which can be easily cleaned, eliminate this difficulty. In several leading restaurants "Silchrome" shades, hand-painted to resemble exactly the original designs, have been substituted for ordinary silk shades. Yet another useful line is the "Altolite" glassware, which resembles alabaster, but is less absorbent, more easily cleaned, and considerably cheaper. These are made with a satin-matt finish and a mottled effect of brown veins on a white ground.

CONTRACTS CLOSED.

The following contracts are announced:—

SIEMENS ELECTRIC LAMPS AND SUPPLIES LTD.:—

Air Ministry; for the supply of large quantities of Siemens special lamps for use on aircraft.

Admiralty; another contract for a further large quantity of Siemens helical traction lamps.

G.P.O.; for the supply of Siemens vacuum and gas-filled lamps for a period of 18 months, commencing September 1st, 1927.

Southern Railway Co.; for the supply of Siemens gas-filled and vacuum lamps for the six months ending February 29th, 1928.

METRO-VICK SUPPLIES LTD.:—

Post Office, Stores Department; for the supply of "Cosmos" gasfilled and vacuum lamps for a period of 12 months commencing September 1st.

WELSBACH DEVELOPMENTS

In the three accompanying illustrations we present views of several of the useful fittings seen on the occasion of the recent press visit to the premises of the Welsbach Light Co. Ltd., described in our last issue.* Fig. 1 shows a very workmanlike type of industrial gas-lighting unit. Attention may be drawn

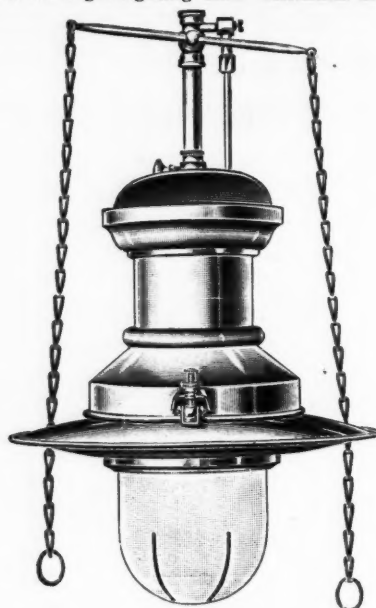


FIG. 1.—A useful industrial Gas Unit, with opalescent globe.

to the small opalescent globe, open at the bottom, which diffuses the light and precludes any possibility of glare. Vitreosil glassware, of similar shape, can be substituted if desired.

In Fig 2 we have one of the decorative diffusing glass bowls, which attracted special attention during the visit, and in Fig. 3 we have the compact little ceiling unit particularly useful in kitchens, bathrooms and the like.

In our last issue we acknowledged the receipt of the season's Welsbach gas catalogue. The corresponding electrical catalogue is also now to hand. This also contains attractively executed illustrations in colour of the decorative glassware, which can be adapted equally well both to gas and electric lighting. Many forms of silk shades, lanterns, and electrical



FIG. 2.—An example of the special Decorative Diffusing Bowls (specially illustrated in colour in the new Welsbach catalogues).

FIG. 3.—A useful Ceiling Unit.

accessories of all kinds are also illustrated. The two catalogues together thus contain practically all that is needed for modern lighting and heating, and serve to show how the interests of the Welsbach Light Co. Ltd. are spread over three illuminants—gas, oil and electricity.

SHOP-WINDOW LIGHTING EQUIPMENT.

From Messrs. Siemens Electric Lamps and Supplies Ltd. we receive a new list dealing with Shop-Window Lighting Equipment and Fittings Accessories. A Foreword, facing a series of attractive illustrations of show windows at night, emphasizes the important part played in the design of reflectors in good window lighting. Many types of reflectors, equipped with colour screens, are illustrated, both of the special extensive and intensive patterns and of the familiar trough type. We notice also particulars of various Holophane units, including the popular totally-enclosed form. The booklet also contains particulars of spotlight projectors, illuminated signs, Venner time switches, electric thermal flashers, etc.

* *The Illuminating Engineer*, September, 1927, p. 265.



REVIEWS OF BOOKS AND PUBLICATIONS RECEIVED

MODERN ELECTRICAL ILLUMINATION, by C. Sylvester and T. E. Ritchie. (Longmans, Green & Co. Ltd., 1927, pp. 416, figs. 367, 425. net.)

This work reviews modern methods of electric lighting. A preface by Mr. R. A. Chattock, Electrical Engineer to the City of Birmingham, emphasizes the important part played by good lighting in daily life, its commercial value, and its utility in such directions as the guidance of traffic. Two introductory chapters deal with the eye and with colour, shadows, etc. These sections are lucidly written, and are assisted by numerous clear diagrams. Reference is made incidentally to various experiments made by the authors, for example those illustrating the relation between speed of vision, visual acuity and illumination. The subsequent 12 chapters are devoted to specific problems in lighting. The lighting of factories, shops and streets, motor-car headlights, floodlighting, domestic lighting, the lighting of public buildings, theatres, clubs, etc., are discussed in turn, and a chapter is devoted to the manufacture of lamps.

A liberal use is made of illustrations, many excellent photographs of lighting installations, doubtless undertaken by the firms with which the authors are associated, being reproduced. These will assist the reader to form a general idea of methods of arranging sources and the types of lighting units now available. Much of the advice is sound enough, and the tables of intensities of illumination, spacing and mounting heights, etc., afford an insight into the procedure of firms in the lighting industry in planning installations.

In view of the wide ground which the book attempts to cover, it is naturally impracticable to deal with any special subject in detail. In such cases it is usually considered expedient to give references to sources whence fuller information can be

obtained. The authors, however, are usually content to put forward their own ideas without quoting authority. Apparently there is no reference throughout the book to the Illuminating Engineering Society, and the work of the various committees which have issued reports on the lighting of streets, schools, factories, etc., is scarcely mentioned. The chapter on street lighting contains a brief reference to the work of the "Joint Committee of 1911," but in the chapter on industrial lighting no reference is made to the reports of the Home Office Departmental Committee on Lighting in Factories and Workshops, though the B.E.S.A. specification for industrial reflector fittings is reproduced *in extenso*.

Some anomalies in sequence and arrangement may be noted. Having discussed the effect of light on the eye, it would have been natural to insert some account of the basis of measurement of light and of the chief photometric units, which are dealt with in a series of definitions at the end of the book. The reader is incidentally introduced to the use of "foot-candles" on p. 13 without any preliminary explanation of this term. Again, a series of general tables, including suggested values of illumination for all types of interiors, is inserted at the end of the chapter on shop lighting. It would surely have been better either to divide such information amongst the sections to which it applies; or to group it in a special chapter so that it would catch the eye of the reader.

The style appears somewhat unequal. In some sections a fair knowledge of illuminating engineering and familiarity with the usual terms are assumed. In others there is needless duplication. For example, it should not be necessary to present simple equations in several alternative forms (p. 49); and such statements as "candle-power equals the total watts divided by watts per candle" are not helpful.

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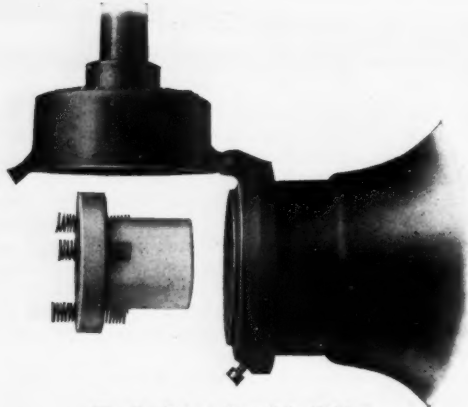
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WARDLE PORCELAIN LAMPHOLDERS.

Our attention has been drawn to a novel and ingenious device, the Wardle porcelain lampholder supplied by The Wardle Engineering Co. Ltd. (Manchester) that deserves to be widely known. The lampholder is mounted above the reflector, and may be removed for wiring, and the pillar type terminals permit direct insertion of the leads through the top of the holder,



Wardle Patent Porcelain Holder.

side entrances being thus entirely dispensed with. The section of the holder is such that when wired it can be replaced in position and the fittings closed without any possibility of twisting the leads. In the accompanying illustration the holder is shown removed for wiring. A further feature is the balanced spring mounting of the holder, eliminating breakage due to vibration.

WOODFYT SALES LTD.—NEW FACTORY.

We had recently an opportunity of visiting the new factory of Messrs. Woodfyt Sales Ltd., which marks a great advance on the previous premises, and is already resulting in a considerable increase of output. Readers will recall that this firm make a speciality of lighting fittings in wood, and many original and pleasing designs are illustrated in the most recently issued catalogue now available.

FURTHER SEASONAL NOVELTIES.

As we go to press particulars reach us of other seasonal publicity programmes, similar to those recorded on p. 296.

Cryselco Ltd. are issuing an effective "broadside" of leaflets executed in various colours and all showing novel features of design. Their latest lamp catalogue is printed in blue, and contains a coloured inset depicting the various uses of colour-sprayed lamps. At the end is a reproduction of the interior of Wembley Church, entirely lighted with Cryselco lamps. The front page bears the familiar figure of "The Colonel" silhouetted against the background of a lamp bulb. We also like the illustration on the front page, a Greek soldier saluting the dawn, and the quotation from Longfellow, "The Prayer of Ajax was for Light."

Two posters have also reached us, both bearing effective sayings: "As a jewel to the hand of a beautiful woman, so is a Cryselco Opal to a beautiful room," and "Drive behind Cryselco—it looks altogether different." The former picture shows a charming lady holding up a Cryselco lamp, the latter, "The Colonel," safely mounted on a car with headlights equipped with Cryselco lamps.

Finally we have to record the receipt of new lists of Met-Vick (Cosmos) lamps, which are well executed and contain much condensed information. We also learn that an imposing Benjamin catalogue is about to make its appearance, and we shall have something to say about this in our next issue.

CONTRACTS CLOSED.

The following additional contracts are now announced:—

GENERAL ELECTRIC CO. LTD.:—

Southern Railway; for Osram vacuum and gasfilled lamps, Robertson carbon-filament lamps, Osram train-lighting lamps, etc., for period September 1st, 1927, to February 29th, 1928.

METRO-VICK SUPPLIES LTD.:—

Westminster Union Board of Guardians; for electric lamps, accessories and cables for a period of 12 months ending September 30th, 1928.



Beautiful Lighting "CARRARA"

DUST-PROOF UNITS

The gracious design of the "Carrara" lighting unit, with its antique brass ornamental work and beautifully modelled white glass, is the crowning touch to the architect's skill.

"Carrara" yields the utmost illumination because its glassware conforms in texture and design to the best results obtained from extensive research and experimental work. There is the maximum diffusion with the minimum absorption of light. No dust can penetrate "Carrara" fittings.

In banks, insurance offices and shop interiors, "Carrara" units are seen at their best. They are made in a variety of beautiful designs.

"CARRARA" SPECIFICATION: F.P. 767.

To take maximum size lamp 200w. G.F. antique brass ornamental metalwork, glass 12 in. dia. x 5 in. lip, 45/-. Complete with 2 ft. of patent chain and lampholder. Lamps, wire and wiring extra. State wattage of lamp when ordering. Oxidized copper 5% extra, oxidized silver 12½% extra.

The Ediswan Illuminating Engineering Department is available to all who care to use it—FREE and without obligation.

Write for ILLUSTRATED UNIT LIGHTING CATALOGUE showing the range of Ediswan dust-proof units.

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